

REVISION OF AUSTRALIAN *HYDROCHUS* (COLEOPTERA: HYDROCHIDAE)

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The Australian members of the hydrochid genus *Hydrochus* are revised and redescribed. Ten species are described as new; *H. abditus*, *H. aenigmatis*, *H. atratus*, *H. burdekinensis*, *H. decorus*, *H. eurypleuron*, *H. cucullatus*, *H. macroaquilonius*, *H. numerosepunctatus* and *H. umbratilis*. The following synonymies are proposed: *H. adelaidae* Blackburn = *H. victoriae* Blackburn; *H. australis* Motschulsky = *H. brunneonitens* Lea = *H. diversiceps* Blackburn = *H. parallelus* MacLeay = *H. polaki* Makhan = *H. rambarani* Makhan = *H. regularis* Blackburn = *H. serricollis* Lea; *H. aschnakiranae* Makhan = *H. schillhammeri* Makhan; *H. horni* Blackburn = *H. scabricollis* Lea; *H. imamkhani* Makhan = *H. schoenmanni* Makhan; *H. multicolor* Lea = *H. mathewsi* Makhan; *H. obsкуроaeneus* Fairmaire = *H. insularis* Lea = *H. palmerstoni* Blackburn = *H. rodjani* Makhan = *H. wewalkai* Makhan; and *H. simplicicollis* Lea = *H. verae* Makhan. A key to the 25 Australian species recognised in the genus is given.

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This is the first attempt to revise the Australian *Hydrochus* Leach since Lea (1927) tabulated the then known species and described several new ones. The genus is the only representative of the world-wide family Hydrochidae in Australia. It is taxonomically difficult. The species are numerous and characters few and variable. They fly readily to light which has resulted in large numbers of specimens being available to me, in contrast to earlier workers who had very sparse and inadequate material, often describing a species from a single individual. Despite this advantage, or perhaps because of it, I view this revision as very much a first attempt at making some taxonomic sense of the *Hydrochus* fauna of Australia, although I do not claim that there is much phylogenetic content to the work.

Individuals are often abundant in both still and running water in all areas of Australia where some surface water exists permanently, with the apparent exception of the channel country of south-west Queensland.

The collections from which specimens were examined are listed under the following abbreviations.

AM Australian Museum, Sydney
ANIC Australian National Insect Collection, Canberra
BPBM Bishop Museum, Honolulu

BM(NH) Natural History Museum, London
CAL California Academy of Sciences, San Francisco
FIELD Field Museum of Natural History, Chicago
CLH Collection of Lars Heindrick, Berlin
DPIM Queensland Department of Primary Industries, Mareeba
IRSNB Institut Royal des Sciences Naturelles de Belgique, Bruxelles
MCZ Museum of Comparative Zoology, Harvard University, Cambridge
NHMW Naturhistorisches Museum, Vienna
NMV Museum of Victoria, Melbourne
NTM Northern Territory Museum, Darwin
QM Queensland Museum, Brisbane
SAMA South Australian Museum, Adelaide
UQIC University of Queensland Insect Collection, Brisbane
WAM Western Australian Museum, Perth
ZMM Zoological Museum, Moscow

The early taxonomy of Australian *Hydrochus* (Blackburn 1898, Lea 1926) is based primarily on the strength of grooves on the head, foveae on the pronotum, and the relative strength of punctures on the elytra. Having examined over 6 000 specimens it is clear that these characters are very variable within species and of limited taxonomic worth.

Early authors were also hampered by the very limited amount of material available, often working with only one or two specimens at a time. Makhan (1994, 1995) added characters of the aedeagi but otherwise relied on this same range of characters and a very limited number of specimens.

Oliva (1995) working on South American species also concentrated on dorsal surface characters in conjunction with the male genitalia but in addition used leg colour and spines on the tibiae in a few cases. In Europe the strength of the apical punctures on the elytra have proved useful (Angus 1977).

CHARACTERS USED IN THIS REVISION

Size

Australian *Hydrochus* vary in length from under one millimetre to over four millimetres. Variation in length within species is considerable: up to two to three times in all those species where a good number and geographic spread of specimens are available.

Dorsal Surface

Head

I found no character of the head to be useful, other than the strength of the setae (see later) and of the Y-shaped epicranial suture to a very minor degree. Blackburn (1898), and Lea (1926) used the relative strength of three longitudinal grooves on the back of the head as a key character. I found the interspecific variation in this character, not to mention its subjective nature, too great for it to be used taxonomically.

Pronotum

Shape: Most Australian species have a similarly shaped pronotum and hence this character has been used sparingly.

Lateral edges: The degree of serration of the pronotal edges can range from none to considerable. This character is a direct reflection of the degree of granulation of the pronotum and has not been specifically used.

Epipleuron: In many *Hydrochus* species the lateral edge of the pronotum is bent under by almost ninety degrees. The width of this portion and its distinctness from the top of the pronotum varies considerably between species and species groups, yet variation within species appears to be only moderate.

Anterior edge: In one species (*H. cucullatus*) the front edge of the pronotum for nearly three quarters of its length is noticeably thickened and hence raised. In all other species this thickening does not occur.

Punctures and granulation: Many Australian species have well developed peg-like granules on the pronotum (and head and elytra). These are positioned in the areas between the punctures and are usually about half the diameter of a puncture. The punctures themselves are relatively large and usually close together. In many species the granulations, particularly on the head, appear as if they are worn down like teeth, and are very low with a smooth flat surface. When the granules are well developed they can completely mask the underlying punctures. The relative mix and strengths of punctures and granules can vary enormously within species. There are species which appear not to have granules and an occasional species (e.g. *H. umbratilis*) that seem always to be strongly granulate. In the bulk of species however the relative mix of punctures and granules is too variable to use as a taxonomic character.

Foveae: A number of relatively large, shallow, depressed areas are found in many species. The boundaries of these foveae may be outlined by raised areas which are sometimes further accentuated by being devoid of punctures or granules. Variation within species is considerable and is usually too great to allow the foveae to be used to separate species but they have a limited use in delineating species groups.

Elytra

Striae and interstriae: All *Hydrochus* have clearly defined linear striae which are punctate, separated by interstriae which are impunctate. As far as I can tell the number of striae and number of punctures in each stria do not vary between species. The strial punctures vary considerably within species as to size, which limits the use of this character taxonomically. In all species the diameter of the punctures is less at each end of a stria and in most cases is relatively uniform over the rest of the stria (and also between adjacent striae). In a few cases the punctures continue to increase in diameter towards the disc and occasionally vary between adjacent striae.

The interstitial areas can be smooth or granulate, with granules placed at the four corners of a puncture, which may have a somewhat squared rather than rounded shape. As on the pronotum, the strength and number of these granules can

vary from a few vestigial ones laterally to masking the punctures over the whole elytron. Again the large intraspecific variation limits the taxonomic usefulness of this character. Some interstitial areas are often raised, either partially or completely, and despite the usual large degree of variation, have proved of some taxonomic value.

Striae are numbered starting from the innermost stria. The first interstria is between striae one and two.

Plicae: In many *Hydrochus* there is a short raised portion of interstria eight just behind the middle. The degree to which the rest of interstria eight is raised and hence incorporates this structure is variable and is of some use in delineating species groups.

Apical punctures: A series of three to four punctures near the tip of each elytron are often differentially enlarged, and sometimes bounded behind by a raised area on the elytron. At the extreme tip there may be another one or two unusually large punctures. These punctures vary considerably between species and, unfortunately, also within most species.

Setae: Small, stout, pale setae are found on the elytra of a number of species. In most species, if present, they are restricted to the extreme apex of each elytron but in a few species they are also found on the interstriae over relatively large areas of the elytra. Similar setae are present in some species on the head and in one or two species on the pronotum as well.

Colour: The dorsal colour, particularly the presence/absence and pattern of elytral spots has proved a useful character. There is also a pronounced polymorphism in many species within my species group 2 where all or most of the dorsal surface can be either golden, silver, steely grey, testaceous or black within one species and often within one population.

Ventral Surface

Palpi and antennae

I have not made a detailed study of the antennae but I could find no obviously useful characters.

The form and colour of both the maxillary and labial palpi vary subtly between species. However I have been unable to usefully harness this variation, nor have I described it.

Legs

I have found the shape of the femora, the

amount of pubescence at the base of the femora and the colour of the legs to be most useful characters to separate both species and species groups.

The profemora of most species are relatively similar in shape but vary in degree of basal pubescence. With the leg pointing forward, the pubescence is greatest on the upper surface next to the body. This surface is usually invisible with the leg in place and I have not used this character. On the lower surface the pubescence narrows to a thin band along the base of the femur adjacent to the trochanter. The area of the femur covered in this pubescence varies from none to quite a bit. In describing this I have compared the minimal length of the area covered (usually in the middle of the femur) with the width of the femur at that point. Within species variation is relatively moderate.

The mesofemora of different species vary considerably in both shape and amount of basal pubescence. Three main shapes are present: a relatively short, stout, parallel-sided form (Fig. 3); a little more elongate somewhat sinuate form with some narrowing towards the base (Fig. 4); and an elongate strongly spindle-shaped form greatly narrowed towards the base (Fig. 5). The amount of pubescence at the base also varies. With the leg pointed backwards the pubescence on the lower surface varies considerably between species but is relatively consistent within species. Usually the edge of the area of pubescence forms a C shape with the narrowest portion in the middle of the lower surface and the longest along the rear edge with a shorter portion along the front edge. The pubescence continues around the top surface of the leg but, as for the profemur, I have not described this surface since the variation is correlated with the variation on the more easily seen lower portion. In describing this character I have usually compared the distance the pubescence reaches along the rear edge of the femur with the width of the femur at that point.

The degree of pubescence and the shape of the femur are closely correlated. Thus strongly spindle-shaped mesofemora have little basal pubescence, stout mesofemora have a moderate amount, and the relatively robust sinuate mesofemora have a lot of pubescence.

There is some variation in the shape of the metafemora which tends to mirror that of the mesofemora. The upper side, with leg pointing backwards, has pubescence to a third to half of its length. The lower side lacks pubescence except

for a small amount coming round from the upper side to a slight degree in some species.

The colour of the legs has also proved useful. Most species have legs which are testaceous with the knees, apex of the tibiae, parts of the tarsi and often much of the femora darker. Other species have yellowish legs with only the tarsi with darker portions. Within most species the degree of dark and light areas is surprisingly consistent.

Elytra

In most beetles the lower edge of the elytron has a narrow shelf-like portion, the epipleuron, which is clearly differentiated from the top of the elytron and turns sharply under the beetle. In most Australian *Hydrochus* the epipleuron is broadened by a modification of the most lateral stria of the elytron which is also turned under to the same degree as the epipleuron (Figs 6–8). As a consequence the most lateral interstria (number 10) effectively becomes the edge of the elytron. Within Australian species the proportion of the underturned shelf formed by the true elytral epipleuron and what is termed the pseudoepipleuron formed from the elytron proper varies considerably between species but within species the relative widths of each do not vary greatly. When describing this character I have used isolated elytra since in the normal closed position the epipleuron is partially hidden in front. Towards the front of the epipleuron all species have a shallow groove along the inner edge which is part of the locking mechanism of the elytra. This varies little between species.

In about the middle of the elytron under interstria eight is a short robust shelf which locks with a raised structure on the thorax when the elytron is closed. This varies a bit in length and inclination but I have not been able to use this variation taxonomically.

Mesosternum

Like the rest of the ventral surface the mesosternum is strongly sculptured. At the front in the centre most species have two well-separated longitudinal carinae (Fig. 1). The area between them can be shallow or relatively deep and can have a weak '+' or 'T'-shaped structure within it. There is certainly a tendency for different species to have particular patterns of infill of this central region but not consistently enough to be taxonomically useful.

Three species have a distinctly different sculpture in this area. In these there are three even, well marked, longitudinal carinae (Fig. 2).

Metasternum

The pattern of punctures on the metasternal plates is very uniform across the Australian members of the genus. The basic pattern consists of 12 to 15 large, well separated punctures arranged in loose rows and arcs. There is a tendency, more marked in some species than in others, for some or most of the punctures to split into two without destroying the underlying standard pattern. In one species, *H. numerosepunctatus*, the metasternum (and mesosternum) is evenly covered with small to moderate punctures with no discernible trace of the basic pattern.

Abdominal sternites

These are strongly sculptured with raised front margins, a central longitudinal raised carina, and four large punctures and a further carina on each side. Although there is variation in the strength of this sculpture I have been unable to use it taxonomically.

Aedeagus

The variation in form of the aedeagus within Australian *Hydrochus* is not as extensive as that shown by *Hydrochus* in other areas (Makhan 1994, Oliva 1995) and differences between species are often slight. Nevertheless I have used it extensively in this revision. In many cases it proved the only reliable character to separate close species. The basal piece is usually parallel sided when viewed vertically but in a number of species it narrows toward the base and in others has a distinct twist. Viewed laterally the basal piece in most species is strongly curved upwards towards the base. The apical piece, consisting of lateral parameres and a central (or medial) lobe, is in all but a couple of species shorter than the basal piece. The central lobe varies considerably between species in width and in length compared to the parameres.

The aedeagi of all but one species, which is identical to another, are illustrated by drawings made with the help of a camera lucida. Where my concept of the species includes a range of aedeagus shapes the extremes are illustrated. Virtually all drawings were made with the apical piece closed up as in nature. In this configuration the central gap between the parameres is neatly filled by the central lobe. Ventral views are given in all cases, which I considered give a slightly better view of any development of the central lobe.

TYPES

The primary types, and most of the secondary types, were examined unless specifically stated otherwise. Blackburn and, to a lesser degree, Lea seldom clearly designated a holotype in their publications. They did however in most cases clearly mark a specimen with a 'T' or 'Ty' or with a TYPE label. In those cases where it is clear from the original description that there was more than one specimen before the author I have designated the specimen marked as a type by the author as the lectotype. In those cases where only one specimen appears to be involved and it is clearly labelled I have, of course, treated it as a holotype.

- dull bronze/golden, elytra often with dark spots, a subscutellar one prominent; elytral apex constricted, squared off. Northern..... *H. imamkhani* Makhan
- Pronotum and elytra granulate, without dark spots, elytral apex rounded 2
- 2. — Elytral epipleuron as wide as pseudoepipleuron anteriorly, never with the elytral granules masking punctures ...
..... *H. adelaidae* Blackburn
- Elytral epipleuron narrower than pseudoepipleuron, often hardly visible when elytra closed, never with weakly granulate, strongly punctate elytra
..... *H. umbratilis* sp. nov.

KEY TO SPECIES GROUPS OF AUSTRALIAN *HYDROCHUS*

- 1. — Front of mesosternum in centre with three longitudinal carinae (Fig. 2.)
..... *Group 1*
- Front of mesosternum in centre with two longitudinal carinae (Fig. 1) 2
- 2. — Elytra with dark spots (may be masked in dark specimens) (Figs 9–11). Mesofemur strongly to moderately spindle-shaped, at base < two thirds its greatest width (Fig. 5) *Group 2*
- Elytra without spots. Mesofemur cylindrical or weakly spindle-shaped, at base equal to or greater than two thirds its greatest width (Figs 3, 4) 3
- 3. — Mesofemur cylindrical or weakly spindle-shaped (Fig. 3). Basal pubescence on mesofemur seldom reaches much beyond apex of trochanter (Fig. 3); pubescence on ventral surface of profemur interrupted or reduced to a very narrow band (Fig.3) *Group 3*
- Mesofemur weakly spindle-shaped (Fig. 4). Basal pubescence on mesofemur usually reaches > one third of the width of femur at that spot along its posterior edge; basal pubescence on profemur complete, reaching > quarter width of femur along ventral surface (Fig. 4).
..... *Group 4*

KEY TO SPECIES IN GROUP 1

- 1. — Pronotum and elytra without granules, except weakly at apex and sides, often

KEY TO SPECIES IN GROUP 2

- 1. — Elytral epipleuron wide, pseudoepipleuron lacking, or virtually lacking, at least in front half (Fig. 8) 2
- Elytral pseudoepipleuron well marked, a quarter width of epipleuron or more (Figs 6, 7) 3
- 2. — Dorsally dark brown to black, without elytral dark spots except very vague ones in some specimens. Base of parameres not narrower than top of basal piece of aedeagus (Fig.17)
..... *H. eurypleuron* sp. nov.
- Dorsally usually iridescent green/gold, elytral spots usually present, often well marked. Base of parameres may be narrower than top of basal piece of aedeagus *H. decorus* sp. nov.
- 3. — Yellow legs, apart from darker areas on tarsi. May have black head and much lighter pronotum. Never have: strongly granulate elytra, moderate to strong apical punctures, strongly serrated elytron edge, length >3.4mm 7
- Legs with darker areas, particularly knees and parts of femora and tarsi. May have strongly granulate elytra, strongly serrated elytron edge, moderate to strongly developed apical punctures, length >3.4mm. Never have: head (black) and pronotum a different colour unless teneral 4
- 4. — East coast south of Mackay. Aedeagus with short broad central lobe (Fig.18). Base of mesofemur narrowing to about

- two thirds of its greatest width. Basal pubescence reaching well beyond end of trochanter. Length 2.5–3.1mm. *H. aenigmatis* sp. nov.
- Northern. Aedeagus with longer central lobe (Figs 9–22). Base of mesofemur narrowing to about half of its greatest width. Basal pubescence not reaching beyond end of trochanter in middle of femur, except in *H. macroaquilonius* which is > 3.1mm in length 5
- 5. — Length < 2.5mm. Pronotal surface rugose to smooth but rather even with relatively shallow punctures and flat granules, apical piece of aedeagus triangular, central lobe narrow (Fig. 19), often with silver and black patches on pronotum *H. atratus* sp. nov. (in part)
- Length >2.0mm. Pronotal surface uneven, apical piece of aedeagus bullet shaped, central lobe wider (Figs 20–22), never with silver and dark patches on pronotum 6
- 6. — Length >3.1mm. Without or with very weak granules. Basal pubescence on mesofemur reaching beyond apex of trochanter in middle of femur. Legs with weak development of dark areas *H. macroaquilonius* sp. nov.
- Length < 3.5mm. Usually granulate, often quite strongly. Basal pubescence on meso femur seldom reaching beyond apex of trochanter in middle of femur. Legs usually with well developed dark regions *H. interioris* Blackburn
- 7. — Front margin of pronotum in central half raised and thickened to about twice normal width. Elytral interstriae two and four often unevenly raised. Central lobe of aedeagus short. *H. cucullatus* sp. nov.
- Not as above 8
- 8. — Mesofemur proportionately narrower at base than metafemur. Anterior spot on elytron usually larger than others. Apical piece of aedeagus relatively small, may be narrower at base than top of basal piece (Figs 19, 24–27). 9
- Mesofemur and metafemur same general shape, although metafemur bit larger. Anterior sutural spot on elytron same size as others. Apical piece of aedeagus relatively longer, base of apical piece approximately same width as basal piece (Figs 28, 29) 11
- 9. — Length 0.9–2.4mm. Elytral epipleuron approximately half width of pseudoepipleuron in front half. Dorsal surface uniformly dark or with silver and dark patches on both elytra and pronotum. *H. atratus* sp. nov. (in part)
- Length 1.6–3.3mm. Elytral epipleuron > half width of pseudoepipleuron in front half. Dorsal surface light to dark testaceous or green/gold (other than head which may be black), with darker spots on elytra 10
- 10. — Length 2.0–3.3mm. Ventral surface testaceous to black. Elytron, when spotted, with anterior sutural spot about same size as others (Fig. 11). Width of base of mesofemur equal to or greater than half its greatest width. Base of apical piece of aedeagus not narrower than top of basal piece (Fig. 24) *H. burdekinensis* sp. nov.
- Length 1.6–2.5mm. Ventral surface black; head and pronotum often greenish, elytra often testaceous/golden/greenish with anterior sutural spot on each elytron usually much larger than others (Figs 9,10). Mesofemur strongly spindle-shaped with its basal width equal to or less than its greatest width. Base of apical piece of aedeagus narrower than top of basal piece, tendency for the central lobe to bulge out above parameres (Figs 25–27). *H. lateviridis* Blackburn
- 11. — Apical piece of aedeagus relatively longer (basal piece 1.0–1.4 times length of apical piece) (Fig. 28). Northern *H. simplicicollis* Lea
- Apical piece of aedeagus relatively shorter (basal piece 1.5–2.0 times length of apical piece) (Fig. 29). Southern *H. obsoletus* Lea

KEY TO SPECIES IN GROUP 3

- 1. — Punctures in inner elytral striae continue to enlarge towards middle of elytra after about puncture four from the base. Northern species 2
- Punctures in inner elytral striae do not

- increase much in size after about puncture four from base. If northern, < 2.6mm long 3
2. — Length > 3.2 mm. Mesosternum evenly covered with deep, relatively small punctures.
 *H. numerosepunctatus* sp. nov
- Length < 2.8mm. Mesosternum usually normally sculptured (relatively few rather large punctures unevenly distributed).....
 *H. obscuroides* Fairmaire
3. — Pronotum rugose to smoothly sculptured, seldom granulate on disc (mainly central Australian specimens). Area of pubescence at base of mesofemur approximately the same area as that of trochanter. Knees dark. Usually have: pinched elytral apex, weak apical punctures, pronotum with bare areas 4
- Pronotum granulate, lacking smooth areas. Area of pubescence at base of mesosternum < area of trochanter. Knees no darker than rest of legs. Apex of elytra rounded with strong apical punctures. N.S.W.
 *H. granicollis* Lea
4. — Length 1.8–2.3mm. Pronotal epipleura weak to absent. Central lobe of aedeagus with broad tip (Fig. 34. Northern (Cape York and Arnhem Land))
 *H. gitaraiiae* Makhan
- Length 2.0–3.4mm. Pronotal epipleura moderate, but often ill-defined. Central lobe of aedeagus with narrow tip (Figs 35, 36). Southern, rarely in North Queensland.
 *H. horni* Blackburn
- bases of parameres usually bulbous, parameres rapidly narrowing in middle, apical half thin, sometimes twisted; central lobe thin; basal piece not twisted. Elytral epipleuron equal to or greater than width of pseudoepipleuron in front half. Basal pubescence on ventral surface of mesofemur reaches a distance equal to or greater than half width of femur along hind edge. Pronotal epipleuron weak or absent. Often quite light to moderately testaceous dorsally
 *H. australis* Motschulsky
- Aedeagus not with above combination of characters. Elytral epipleuron equal to or less than pseudoepipleuron in width in front half. Basal pubescence on mesofemur reaches a distance equal to or less than half width of femur along hind edge. Pronotal epipleuron usually moderately developed. Black dorsally .. 3
3. — Aedeagus with base twisted, central lobe narrow with tip twisted to left (viewed ventrally), parameres weakly asymmetric to accommodate off-centre central lobe tip, parameres narrow towards tips (Fig. 38).....
 *H. aschnakinarae* Makhan
- Aedeagus with base with at most only a hint of a twist, central lobe moderately wide, parameres symmetric (Figs 39, 43, 44)..... 4
4. — Aedeagus with parameres narrowing rapidly in middle, narrow and even in width in apical half, central lobe wide (Fig. 43)
 *H. abditus* sp. nov.
- Aedeagus with parameres relatively wide, tips paddle-shaped, may be waisted (Figs 39, 44)..... 5
5. — Aedeagus with apical piece squat, parameres bulbous at base, apical piece approximately twice as long as wide, basal piece narrowing towards base (Fig. 39).....
 *H. kunarajahi* Makhan
- Aedeagus with apical piece more elongate, apical piece > twice as long as wide (Fig. 44)
 *H. radjiei* Makhan

KEY TO SPECIES IN GROUP 4

1. — Elytral interstria two raised for short distance near base, interstria four raised in central portion of elytron ending abruptly behind middle (occasional specimens have only weakly raised interstriae). Aedeagus with basal piece 1.7–1.9 times length of apical piece, which is narrowly triangular and sharply pointed (Fig. 40)
 *H. multicolor* Lea
- Elytral interstriae if raised then evenly and relatively weakly. Aedeagus with proportionately much longer apical piece (Figs 38, 39, 41–44)..... 2
2. — Aedeagus with apical piece elongate,

DESCRIPTIONS

In the following sections the descriptions of species are arranged alphabetically within each of the four species groups.

Species Group 1

A group of three relatively large species characterised by having three rather than two longitudinal carinae at the front of the mesosternum and stout broad aedeagi. The two southern species, *H. adelaidae* and *H. umbratilis*, are very similar and seem distinct from the northern *H. imamkhani* which is the only Australian species with spotted elytra other than group 2 species.

The two southern species are found at the sides of poorly vegetated, often deeply shaded, pools most frequently among dead leaves and other detritus. *Hydrochus imamkhani* is found in more open areas amongst emergent vegetation in still or slow moving water.

Hydrochus roepnaraini Makhani from New Caledonia belongs in this group.

Hydrochus adelaidae Blackburn

Hydrochus adelaidae Blackburn, 1888 p. 832

= *Hydrochus victoriae* Blackburn, 1888 p. 834; syn. nov.

Types

Hydrochus adelaidae Blackburn. *Holotype*: 'T 1618 ?A' 'Australia Blackburn Coll. B.M. 1910–236' 'Hydrochus Adelaidae', BMNH. Blackburn (1888) gives the type locality as 'River Torrens near Adelaide'.

Hydrochus victoriae Blackburn. *Lectotype*: 'Type' 'T 1551 V' 'Australia Blackburn Coll. B.M. 1910–236' 'Hydrochus victoriae Blackb.', BMNH. Herein designated. Blackburn (1888) gives the type locality as 'Ararat Victoria'.

Paralectotype: 1, '1551V' 'Victoria Blackburn' 'Hydrochus victoriae Blackb. Co-type' SAMA. Herein designated.

Description (number of specimens examined, 42)

Size 2.5 to 3.7mm. Broadly elongate, elytra wider than pronotum, widest just behind middle, apex rounded. Head black; pronotum black, often with vague testaceous front margin; elytra testaceous to dark testaceous; ventral surface dark testaceous to black; legs light testaceous lacking darker knees. Head with large granules, epicranial suture weakly to moderately marked. Pronotum weakly waisted, densely covered with granules, which mask punctures; foveae virtually absent; epipleuron distinct, about one puncture

width wide. Elytra without granules to moderately granulate, punctures relatively large often increasing in size considerably towards centre of elytra within a stria, interstria four tends to be raised particularly just behind middle, plica indistinct, apical punctures weak. Setae on head and towards apex of elytra weakly developed. Front of mesosternum in centre with three longitudinal carinae, the distance between them greater than their widths. Pseudoepipleuron moderately developed, epipleuron weakly developed in apical half, quite strongly developed in anterior half where it is approximately same width as pseudoepipleuron. Profemur moderately stout, basal pubescence moderate, about a quarter width of femur at base. Mesofemur elongate, narrowing to about two thirds greatest width towards base, basal pubescence well developed reaching to about a half width of base of femur beyond trochanter on ventral rear margin. Metafemur elongate, bowed on front margin.

Male: Basal piece of aedeagus broad, subparallel, 1.4 to 1.8 times length of apical piece. Parameres wide in basal half, narrowing towards tip. Central lobe relatively narrow, sharply pointed, reaching to end of parameres. Similar to that of *H. umbratilis*, Fig. 14.

Distribution

South Australia

Williamstown, SAMA.

Tasmania

Launceston, SAMA.

Victoria

Buangor, SAMA; 5 km NW Portland, SAMA.

Remarks

This species appears close to *H. umbratilis* but the strongly punctate and usually granule-free elytra readily tell them apart. For those specimens with more strongly granulate elytra (usually with weaker punctures also) the wider elytral epipleura will separate them. The elytra are often lighter in colour than the pronotum which seldom is the case in *H. umbratilis*. The parameres appear to narrow a little less abruptly in this species but the aedeagi are otherwise very similar. The pronotal epipleura are a little narrower than in *H. umbratilis*. *Hydrochus australis* is superficially similar, particularly strongly granulate specimens, but the front of the mesosternum, and the very different aedeagi readily separate them. Nor do *H.*

australis have the large elytral punctures seen in most *H. adelaidae*.

Biology

The species is most often found amongst dead leaves at the edges of ponds, which are often shaded and poorly vegetated.

Hydrochus imamkhani Makhan

Hydrochus imamkhani Makhan, 1994

Type

Holotype: 'New Guinea; SE Weam, 9m 18.VI.1964' 'H. Clissold Light Trap BISHOP MUSEUM', BPBM.

Description (number of specimens examined, 94) Figs 2, I2, I3

Length 2.8 – 4.4mm. Elongate, elytra weakly to moderately broadened behind middle, narrowing quite abruptly near apex, obliquely truncate. Head dark brown to black, with iridescent sheen; pronotum dark brown, front margin sometimes lighter, often shiny iridescent green/gold; elytra dark brown to a shiny green/gold/silver surface, frequently with dark spots/markings, one of the more prominent around scutellum; ventral surface dark brown to black, legs light testaceous with parts of tarsi and knees darker. Head granulate/punctate, epicranial suture weak. Pronotum rugose/punctate, punctures relatively small, sides may be weakly to moderately granulate, foveae weak, not bounded by raised areas, tendency for central third longitudinally to be raised, epipleuron well marked, one to two punctures deep, often fluted. Elytra usually rather smooth with small to medium, even-sized punctures, not granulate or with relatively weak granules at sides and apex; without apical punctures, interstriae variable from almost unraised to quite strongly swollen, in the latter case alternate interstriae unevenly raised with interstria four having a more prominent portion at start of elytral declivity, interstriae in dark areas not swollen and may even be slightly sunken, in some specimens some other striae weakly raised in places also; plica usually recognisable but incorporated into interstria eight if raised. Setae small but well developed on head and towards rear of elytra. Pronotal epipleuron distinct, two to three puncture widths deep, often fluted. Pseudoepipleuron moderately to quite well developed; epipleuron absent towards rear, weak in front, ridge between pseudoepipleuron and epipleuron strong. Profemur moderately elongate,

weakly sinuate, basal pubescence weak, reduced to a very narrow band ventrally < quarter width of femur. Mesofemur elongate narrowing in basal third to about two-thirds its greatest width, basal pubescence moderate, reaching between a fifth and a third of width of femur at that point along rear margin beyond end of trochanter. Metafemur elongate, front edge weakly bowed. Front of mesosternum in middle with three broad longitudinal carinae, the lateral two usually broader than central one, area between carinae much narrower than carinae, behind these are a row of four round punctures. Metasternal punctures smaller and more numerous than in most other Australian species.

Male: Basal piece of aedeagus broad, subparallel, 1.5–1.6 times length of apical piece. Apical piece bullet-shaped, parameres broad in basal half thin in apical quarter; central lobe relatively broad, sharply pointed, tip bent downwards, reaching to ends of parameres. Fig. 12.

Distribution

Northern Territory

Berry Springs, ANIC; Florence Falls, Litchfield NP, NHMW, CLH; Holmes Jungle, ANIC; Howard Springs, ANIC; Katherine, ANIC; Lake Bennett, NTM; Jabiru, SAMA; 10 km SW Jabiru, SAMA; 20 km SSW Jabiru, SAMA; Jim Jim Highway, Kakadu NP, CLH, NHMW; Jim Jim Falls, Kakadu NP, NHMW; 19 km E by S Mt Borradaile, ANIC; Murganella, NTM.

Queensland

8 km N Bluewater, SAMA; Cape Flattery area, DPIM; Dalby, SAMA; Dalhunny River, SAMA; Eubenargee Swamp, SAMA; 70 km SW Greenvale, SAMA; Iron Range, ANIC, UQIC; Jardine River, UQIC; Lockerbie, UQIC; Mareeba, NHMW; 21 km E Mareeba, DPIM; Mary Creek., ANIC; 8 km E Mt Cahill; 2 km S Mt Molloy, SAMA; 2 km N Mt Molloy, SAMA; 6 km ENE Mt Tozer, ANIC; 11 km ENE Mt Tozer, ANIC; 3 km NE Mt Tozer, ANIC; 2 km NNE Mt Tozer, ANIC; 3 km NE Mt Webb, ANIC; ANIC; Peach Creek, SAMA; 5 km W by W Rounded Hill, ANIC; Tolga, DPIM.

Western Australia

Carson Escarpment, ANIC; Drysdale River, ANIC; 12 km S Kalumburu Mission, ANIC; Mitchell Plateau, SAMA, ANIC; Peron Peninsula, WAM; Regans Ford, ANIC.

Remarks

A large, distinctive, isolated species unlikely to be confused with any other Australian species. *Hydrochus roepnaraini* Makhan from New Caledonia appears to be close. Based only on the type specimen, *H. roepnaraini* has a similar mesosternal front and similar dorsal colour and sculpture to those *H. imamkhani* which have most elytral interstriae raised to some degrees in some places. The aedeagi are quite different with *H. roepnaraini* having a much longer apical piece (see fig. 26 in Makhan 1994).

Hydrochus imamkhani was described from New Guinea but an examination of the type shows that it is conspecific with Australian specimens. Makhan (1994) thought it was similar to *H. rodjani* but this species is a junior synonym of *H. obscuroaeenus*, a very different species from *H. imamkhani*.

I have seen two specimens of *H. umbratilis* from near Cardwell in North Queensland. Their dark colour, lack of elytral spots, strongly granulate pronotum and stouter legs separate them from *H. imamkhani*.

Biology

Most frequently found amongst emergent vegetation in ponds, swamps or slowly moving water. Taken at light.

Hydrochus umbratilis* sp. nov.*Types**

Holotype: Male, 'VIC 10 km NE Mirranatwa 12/10/97 C. Watts', SAMA.

Paratypes: 35, same data as holotype, SAMA.

Description (number of specimens examined, 93) Fig. 14

Length 2.1 – 4.7mm. Broadly elongate, elytra widened somewhat behind middle, apex rounded. Dorsal surface testaceous to black; ventral surface dark brown, legs testaceous, parts of tarsi, knees and femora often darker. Head granulate, epicranial suture weak to moderate. Pronotum moderately to densely granulate, foveae virtually absent. Elytra moderately to very strongly granulate, punctures when visible small to moderate, alternate elytral interstriae weakly to strongly raised with interstria four often strongest; plica absorbed into interstria eight. Setae well developed on head and apical half of elytra. Pronotal epipleuron distinct, about one and a half puncture widths deep, often fluted. Front of mesosternum in centre with three longitudinal

carinae, lateral ones about same width as central, area between them about equal to their width, tendency in some populations for this area to become relatively smooth and the carinae indistinct. Mesosternal punctures tending to be smaller and more numerous than usual. Pseudoepipleura moderately to quite strongly developed, epipleura absent behind, weak in front. Profemur moderately stout, basal pubescence relatively weak, reduced to very narrow band ventrally. Mesofemur elongate, narrowing a bit toward base, basal pubescence weak to moderate, at weakest reaching to end of trochanter at strongest reaching to about a quarter the width of base of femur beyond trochanter on ventral rear margin. Metafemur elongate, bowed on front margin.

Male: Basal piece of aedeagus broad, subparallel, 1.4 – 1.8 times length of apical piece. Parameres wide in basal half, rapidly narrowing, thin apically. Central lobe relatively narrow, sharply pointed, reaching to end of parameres (Fig. 14).

Distribution**Australian Capital Territory**

25 km W Canberra, ANIC.

New South Wales

Armadale, ANIC; Berry, SAMA; Collector, SAMA; 14 km W Delagate, SAMA; Nerriga, SAMA; 6 km N Uralla, ANIC.

Queensland

Caloundra, SAMA; Cardwell, ANIC; 10 km S Cardwell, SAMA; Cunninghams Gap, SAMA

Tasmania

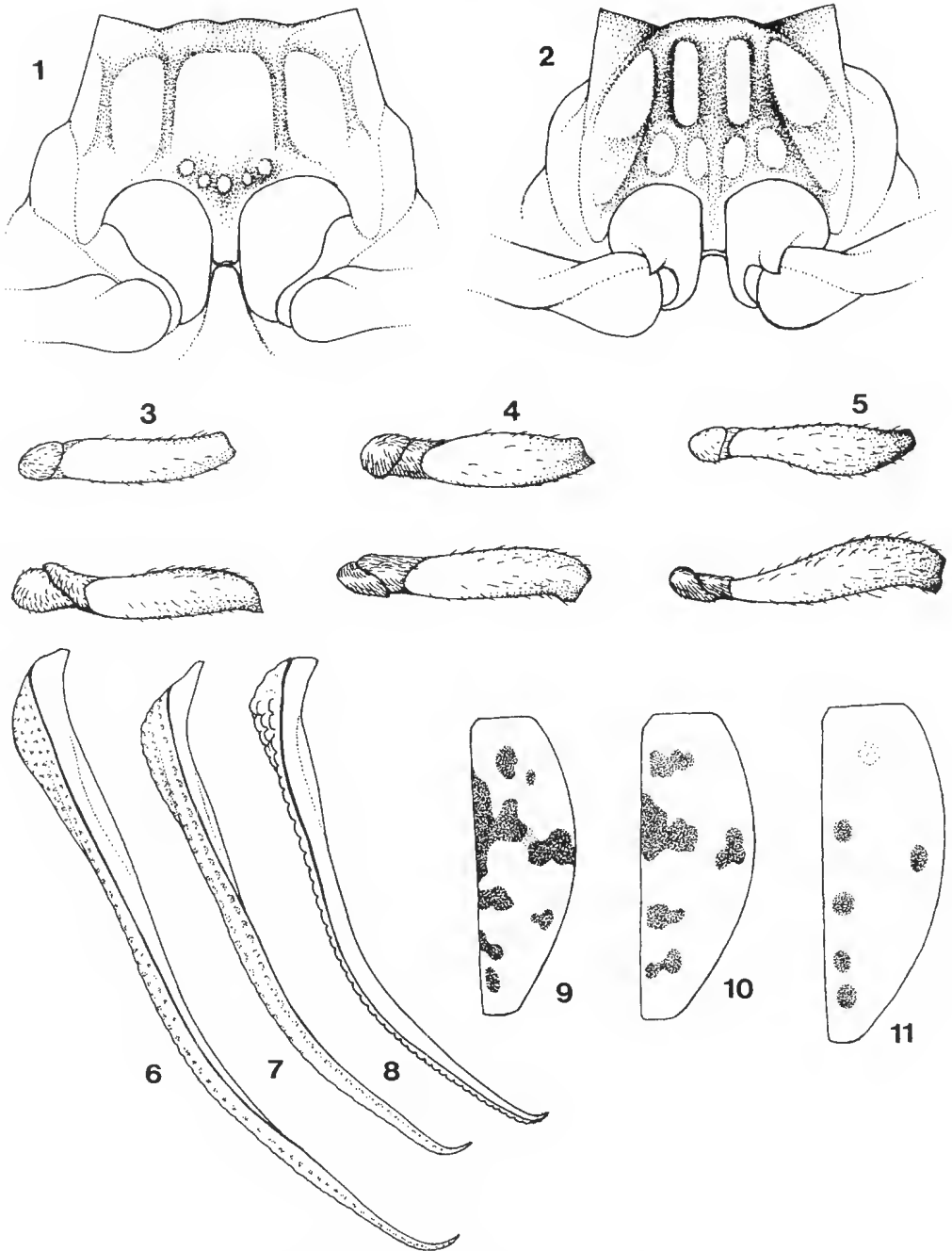
Launceston, SAMA; 5 km W Maydena, NHMW

Victoria

Buangor, SAMA; Eustace Gap Creek, NMV; Glenferrie, CAL; Grampians, SAMA; 18 km NW Licola, NMV; 10 km NE Mirranatwa, SAMA; 4 ml NE Nelson, NMV; 12 km SW Orbost, SAMA; 5 km NW Portland, SAMA; 3 km SE Taggerty, NMV.

Remarks

This species and *H. adelaidae* are the only species in southern Australia with three longitudinal carinae at the front of the mesosternum. The narrower elytral epipleura in this species is the only certain character to separate the two. However, *H. adelaidae* never



FIGURES 1-11. 1, Front of mesosternum of *H. burdekinensis*, with two longitudinal carinae; 2, Ditto of *H. imamkhani*, with three longitudinal carinae; 3, Pro(top) and meso femora (below) of *H. obsкуроaeneus*, a group 3 species; 4, Ditto, *H. aschnakiranae*, a group 4 species; 5, Ditto, *H. interioris*, a group 2 species; 6, Ventral view of elytron edge in *H. australis* showing epipleuron (right) and pseudoepipleuron (left) of approximately equal widths; 7, Ditto, *H. aschnakiranae* showing weaker epipleuron; 8, Ditto, *H. eurypleuron* showing wide epipleuron and virtual lack of pseudoepipleuron; 9-10, Dorsal views of elytra showing variants of the colour pattern in *H. lateviridis*; 11, Ditto, *H. burdekinensis*.

have strongly granulate elytra and *H. umbratilis* never have elytra with large punctures which often increase in size towards the middle of the elytra within one stria (this character is best viewed when the specimen is dry since when wet the appearance of granules is enhanced). The three longitudinal carinae, and the weak elytral epipleura will separate it from strongly granulate forms of *H. australis*. It is also a wider and darker species than *H. australis* with stronger pronotal epipleura. It shares with *H. imamkhani* the three carinae on the front of the mesosternum and also a tendency for the mesosternal punctation to be composed of numerous rather small punctures. The aedeagi are also very similar but the apical piece is shorter and the central lobe narrower than in *H. imamkhani*. It can be separated from this species most readily by its strongly granulate dorsal surface, dark colour and rounded elytral apex.

Specimens from north coastal NSW to north Queensland are often chunkier with stouter legs, the alternate elytral interstriae more strongly raised and the elytral granulations usually weaker. Further specimens and study could well result in them being considered a separate species.

Biology

Found in dead leaves at the sides of still or slowly moving water, often in shaded situations.

Etymology

Latin, 'of the shade' – in reference to its dark colour and the fact that it is often found in deeply shaded ponds.

Species Group 2

The largest of the groups in terms of species, group 2 is characterised by having: two rather than three longitudinal carinae at the front of the mesosternum (Fig. 1); dark spots on the elytra which are often coloured in some way (Figs 9–11); thin spindle-shaped legs with weak basal pubescence (Fig. 5). All species have the elytral spotting to a greater or lesser degree but not all individuals. The only other Australian *Hydrochus* with similar markings is *H. imamkhani* in group 1. Other character states that tend to distinguish the group are: lack of, or virtually lack of, setae on the dorsal surface; pubescence on the mesofemora usually not reaching much past the end of the trochanter; pubescence on the profemora complete but narrow ventrally (Fig. 5);

pronotum either lacks or has very weak foveae; pronotal epipleura usually well marked; head with only a weak development of the epicranial suture; elytra usually smooth or with only weakly raised interstriae (in one species, *H. cucullatus*, they may be strongly raised) and the plicae are usually obvious.

All member species whose habitat is known live in relatively clean sand/gravel at the sides of rivers and streams. They are typically found in large numbers at the edges of sandy pools in the beds of drying rivers in tropical Australia where they are often concentrated just below the surface of the sand. All species in this group that I have observed, when dislodged, put their heads down and attempt, albeit weakly, to swim to the bottom, in contrast to species of other groups which use the surface film to crawl upside down until they reach the side or emergent objects or vegetation. They also appear more adept at clinging to sand grains etc. on the bottom than species in other groups. This is often seen in collecting trays where group 2 species tend to be on the bottom of the tray and species of other groups tend to float on the surface.

The group is primarily tropical with only *H. obsoletus* commonly found in southern Australia.

Hydrochus aenigmatis sp. nov.

Types

Holotype: male, 'Webers ck NSW 2/11/94', SAMA.

Paratypes: 4, same data as holotype, SAMA; 1, 'Megalong Vy. Blue Mts N.S.W. Jan 20°32,1000ft' 'Australia Harvard Esp. Darlington', MCZ; 1, '21 ml. S of Miriam Vale Q 24°38S 151°34E 14.xii.1968 E. Britton & S. Misko', ANIC.

Description (number of specimens examined, 10)
Fig. 18

Length 2.5 – 3.1mm. Elongate, elytra a little wider in the middle, tip rounded or weakly obliquely truncate. Head and pronotum dark steely-grey often with silver reflections; elytra dull brown to steely-grey, three to four rather small dark spots near suture, usually indistinct, about equal in size; ventral surface dark brown to black, legs testaceous, parts of tarsi, knees and basal part of femora darker. Head shallowly and rather smoothly granulate/punctate, epicranial suture weak. Pronotum with rather sparse, small shallow punctures, occasionally weakly granulate laterally,

surface uneven, foveae indistinct. Elytra with relatively small punctures, separated within striae by about same width as interstriae or a bit less; alternate interstriae not or only weakly raised; plica present; apical punctures usually well developed. Setae virtually absent from head and elytra. Pronotal epipleuron poorly defined, about two puncture widths wide, weakly fluted. Elytral pseudoepipleuron moderate, epipleuron absent apically, weak behind middle, widening to about same width as pseudoepipleuron in front. Front of mesosternum in centre with two narrow, raised, longitudinal carinae, the area between them shallow to moderately deep, particularly behind. Profemur rather stout, basal pubescence weak, reduced to a narrow band ventrally. Mesofemur elongate, weakly spindle-shaped, narrowing basally to about two thirds its greatest width, basal pubescence moderate, reaching to between a quarter and a half width of femur past trochanter on ventral edge. Metafemur elongate, bowed on front edge narrowing to about three quarters its greatest width basally.

Male: Basal piece of aedeagus straight sided, 1.5 to 1.7 times length of apical piece. Apical piece bullet-shaped, parameres narrow and weakly paddle-shaped in apical half. Central lobe very wide, considerably shorter than parameres; in lateral view ventral surface flat, width rapidly reducing in middle (Fig.18).

Distribution

New South Wales

Megalong Valley, MCZ; Webers Creek, SAMA.

Queensland

15 km W Gympie, NMV; 21 ml S Miriam Vale, ANIC.

Remarks

A rare species from the east coast, separable from other group 2 species with dark legs by its relative lack of granules, stouter legs and more extensive basal pubescence on the mesofemora. It can be confused most readily with the much commoner *H. interioris*, from which it differs in having stouter mesofemora with a greater amount of basal pubescence, and a broader central lobe to the aedeagus. Based on the few specimens known, *H. aenigmatis* also appears to be a more southern species than *H. interioris*.

In size and general colour *H. aenigmatis* approaches *H. obsoletus*, the only other group 2 species in the South-east. It differs from this

species in the stronger basal pubescence on the mesofemur, which reaches more than a quarter the width of the femur past the trochanter whereas in *H. obsoletus* it usually is only a bit beyond the end of the trochanter; in the dark areas on the legs; in the rougher pronotal surface; narrow less distinct pronotal epipleura and in having the pronotum the same colour as the head whereas in *H. obsoletus* the head is often darker. The male genitalia approach those of *H. obsoletus* but have a much broader central lobe and, in lateral view, the apical piece is flat dorsally and narrows abruptly in the middle ventrally, in contrast to the more evenly narrowing shape in *H. obsoletus*.

Biology

Nothing known

Etymology

Latin. 'Obscure'— a reference to its rarity.

Hydrochus atratus sp.nov.

Types

Holotype: male, 'Qld. Burdekin r. E of Charters Towers 4 May 1998 C.H.S. Watts', SAMA.

Paratypes: 16 same data as holotype, SAMA.

Description (number of specimens examined, 221) Fig. 19

Length 0.9 – 2.4mm. Elongate, elytra wider behind middle, rounded or somewhat pinched near apex. Head shiny black; pronotum shiny black, granules if present often silver; elytra dark brown to black with vague darker spots in some, occasionally quite silvery; ventral surface dark brown to black, legs light to quite dark testaceous, parts of tarsi, knees and femora usually darker. Head granulate/punctate often with bare areas, epicranial suture weak to moderate. Pronotum variable, from strongly granulate/punctate to dense, rugose, rather large punctures, foveae absent. Elytra variably granulate/punctate, punctures moderate sized, within striae separated by about width of interstriae. Interstriae four and eight may be weakly raised in parts, plicae visible. Setae on head and elytra absent. Pronotal epipleuron poorly to moderately defined but relatively deep. Front of mesosternum in middle with two narrow longitudinal carinae, area between them quite deeply excavated in front, less so behind. Elytral pseudoepipleuron moderate to broad, epipleuron absent behind increasing to equal to width of pseudoepipleuron or a little less

in front third. Profemur elongate, basal pubescence moderate, reaching to about a quarter width of femur ventrally. Mesofemur spindle-shaped, narrowing to more than half its greatest width in basal quarter, basal pubescence weak, reduced to a very narrow band ventrally. Metafemur rather broad, bowed on front edge, narrowing to nearly half its greatest width toward base.

Male: Basal piece of aedeagus with parallel sides or weakly converging toward base, 1.8 – 2.1 times length of apical piece. Apical piece moderately to strongly elongate triangular, in more elongate forms with constriction in middle. Central lobe narrow, nearly as long as parameres (Fig. 19).

Distribution

Northern Territory

Adelaide River, ANIC; Cooper Creek near Mt Borradaile, SAMA; 20 km SSW Jabiru, SAMA; Kongarra, NTM; Korlonjorlok Stream, Kakadu NP, NTM; 6 km E Mt Cahill, NTM; 8 km E Mt Cahill, ANIC; 19 km E by S Mt Borradaile, ANIC; 5 km SE Mt Borradaile Station, SAMA; 11 km S by W Nimbuwah Rock, NTM; 6 km SW by S Oenpelli, ANIC; UDP Falls, Kakadu NP, NTM; Woolwonga Fauna Reserve, ANIC.

Queensland

Archer River, SAMA; Borumba Dam, CLH, NHMW; Burdekin River, SAMA; Burdekin River E of Charters Towers, SAMA; Dalrymple, 30 km N Charters Towers, NHMW; 70 km SW Greenvale, SAMA; 2 km S Mt Molloy, SAMA; Starr River, SAMA.

Western Australia

Augustus Island, ANIC; Drysdale River, ANIC; 12 km S Kalumburu Mission, ANIC; 14 km S by E Kalumburu Mission, ANIC; 4 km W King Cascade, ANIC; Kunmunya Mission, ANIC; 4 km S by W Mining Camp Mitchell Plateau (15.38S 125.15E), ANIC; 10 km NW by N Mining Camp Mitchell Plateau, ANIC; Point d'Entrecasteaux, WAM.

Remarks

Specimens of the species are the smallest Australian *Hydrochus*, with Northern Territory and Kimberley specimens often less than a millimetre long. In certain parts of their range they can reach 2.5mm which overlaps the size range of the very similar *H. interioris*. *Hydrochus interioris* is larger, the pronotal surface is very

uneven and the apical punctures on the elytra are often well developed whereas in *H. atratus* the pronotal surface (ignoring the punctures) is relatively smooth and the apical punctures seldom larger than adjacent punctures. Small individuals of *H. interioris* are difficult to separate from *H. atratus* other than by the aedeagus. In general *H. atratus* are darker, without elytral spots, rounded more than elongate and may have dark shadows on the pronotum. The aedeagus in *H. atratus* has a more triangular shaped apical piece and narrower central lobe.

Hydrochus atratus is easily separated from well coloured individuals of *H. lateviridis* but larger specimens can be very similar to dark specimens of *H. lateviridis*. From *H. lateviridis* it differs in the narrower elytral epipleura, in often having dark portions to its legs, in the stouter meso and metafemora which narrow to between two thirds and half their greatest widths basically, rather than to more than half in *H. lateviridis*, and in the pronotum and head of *H. lateviridis* often having a greenish tinge absent in *H. atratus*. *Hydrochus atratus* often has, uniquely in Australian *Hydrochus*, dark and light areas on the pronotum. The aedeagi of some *H. atratus* resemble those of some *H. lateviridis* but in *H. lateviridis* the central lobe is more exposed and bulbous, the base of the apical piece is always narrower than the basal piece and the aedeagus may be twisted (Figs 25 – 27).

Four specimens from Kunmunya Mission, WA, in ANIC belong to this species or possibly a new one. They differ in having broader pseudoepipleura, a more uneven pronotal surface and a narrower, waisted apical piece to the aedeagus.

Biology

Found most commonly in bare coarse sand at the edge of small pools beside seasonally drying large rivers. In such places they can be extremely abundant. Taken at light.

Etymology

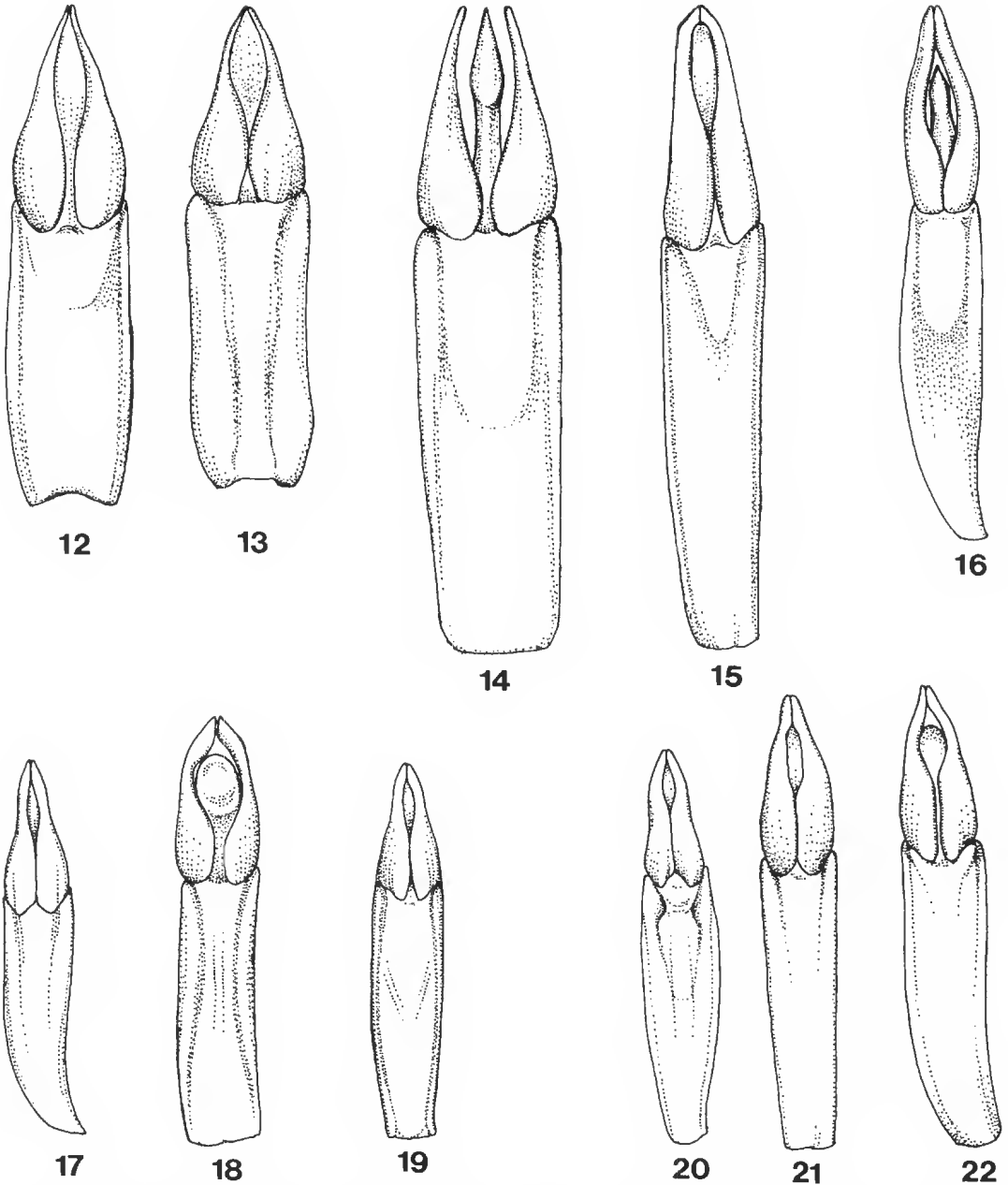
Latin. 'Dressed in black' – a reference to its black colouring.

Hydrochus burdekinensis sp. nov.

Types

Holotype: male, 'Qld. Burdekin r E of Charters Towers. 4 May 1998 C.H.S. Watts', SAMA.

Paratypes: 60, same data as holotype, SAMA.



FIGURES 12–22. 12–13, Ventral views of two forms of aedeagus in *H. imamkhani*; 14, *H. umbratilis*; 15, *H. macroaquilonius*; 16, *H. decorus*; 17, *H. eurypleuron*; 18, *H. aenigmatis*; 19, *H. atratus*; 20–22, forms of *H. interioris*.

Description (number of specimens examined, 380) Figs 1, 11, 24

Length 2.0 – 3.3mm. Broadly elongate, elytra weakly wider behind middle, constricted slightly towards apex. Head black, often with greenish

iridescence; pronotum light testaceous, sometimes darker testaceous on disc or, rarely, over whole pronotum; elytra usually light testaceous to testaceous, with darker elytral spots varying from absent to moderate, spots sub equal

in size (Fig. 11), occasional specimens mainly from western Arnhem Land are silver/golden/greenish on most of the dorsal surface; ventral surface testaceous to black, legs yellow testaceous except for darker tip to tarsi. Setae lacking on dorsal surface. Head sparsely to moderately covered with weak punctures, epicranial suture weak. Pronotum varying from smooth with moderate punctures to rugose/punctate to densely covered with small granules. Elytral punctures small to moderate, area between them within striae usually less than width of interstriae, occasionally with weak to moderate granules; interstriae not or only weakly raised; plicae present. Pronotal epipleuron distinct, shiny, two to three punctures deep, occasionally fluted. Pseudoepipleuron moderate, elytral epipleuron absent behind, narrow in middle, widening only slightly in front third. Front of mesosternum in centre with two longitudinal carinae, area between them moderately excavated. Profemur moderate, basal pubescence weak, reduced to narrow band ventrally. Mesofemur spindle shaped, narrowing to half to a third greatest width, basal pubescence very weak to moderate, reduced to a narrow band ventrally. Metafemur stouter than mesofemur.

Male: Basal piece of aedeagus with sides parallel, 2.0 – 2.7 times length of apical piece. Apical piece bullet-shaped, central lobe moderately wide, pointed, nearly as long as parameres (Fig. 24).

Distribution

Northern Territory

5 km SE Mt Borradaile Station, SAMA; 33 km SW Borrooloola, ANIC; 14 km NW Cape Crawford, ANIC; Cooper Creek near Mt Borradaile, SAMA; Deaf Adder Gorge Kakadu NP, NTM; Edith Falls near Katherine, CAL; Jim Jim Creek, Kakadu NP, ANIC; Jim Jim Falls, Kakadu NP, CLH, NHMW; 1 km W Gubara, Kakadu NP, SAMA; Malapanbango Creek Kakadu NP, NTM; 8 km E Mt Cahill, ANIC; 9 km SSE Mudginbarry Homestead, ANIC

Queensland

Boar Pocket Road, ANIC; Burdekin River, SAMA; Burdekin River E of Charters Towers, SAMA; Bushy Creek, Mossman – Mt Lewis Road, ANIC; Cardstone, ANIC; Charters Towers, SAMA; Hann River, NMV; Kuranda, ANIC; 73 km NW by W Laura, ANIC; 70 km N Laura, DPIM; Lake Tinaroo, ANIC; Mary Creek, ANIC, SAMA; 60 km NW Mt Isa, SAMA; 60 km W Mt

Garnet, DPIM; Musgrave, DPIM; 1 km W Petford, SAMA; 1 km WSW Petford, DPIM; Strathmore Station, DPIM.

Western Australia

17 km N by E Cane River Homestead, ANIC; De Grey River, ANIC; Gascoyne River, ANIC; 12 km S Kalumburu Mission, ANIC; 4 km W King Cascade, ANIC; Millstream, ANIC; Mitchell Plateau, ANIC; Regans Ford, ANIC; Synnot Creek, ANIC; West Peawah River, ANIC, SAMA; Winjana Gorge, CAL.

Remarks

Widespread and relatively common in northern Australia, *H. burdekinensis* can be most readily recognised by its testaceous legs and, in the majority of specimens, testaceous elytra and pronotum. The darker spots on the elytra are usually not well marked and often absent.

Hydrochus burdekinensis can most easily be confused with *H. simplicicollis* which is a rarer species known only from North Queensland. Its black ventral surface and extensive area of dark testaceous on the pronotum will separate *H. simplicicollis* from most *H. burdekinensis*. *Hydrochus simplicicollis* also has stouter mesofemora, which, unlike *H. burdekinensis*, are similar in shape to the metafemora although a bit smaller overall. The apical pieces of the male aedeagi differ considerably in comparative length between the two species (Figs 24 – 27). *Hydrochus lateviridis* is generally a smaller species with greenish tinges and much more strongly developed dark markings on the elytra (Figs 9, 10). Some specimens of *H. obsoletus* from New South Wales are identical in colour to some *H. burdekinensis* but differ in having stouter legs and a more elongate apical piece of the aedeagus. In the Northern Territory specimens are often a rather uniform greenish/golden on the dorsal surface and can be confused with smaller specimens of *H. macroaquilonius*. They can be separated from this species by their yellow legs, stronger elytral epipleura and better developed pronotal epipleura. The aedeagus of *H. macroaquilonius* can not be separated from the more elongate forms of the aedeagus of *H. burdekinensis* which can be found in the same region.

Biology

A common species in bare sand at the edge of moderate to large rivers. Taken at light.

Etymology

A reference to the river where the species is particularly common.

Hydrochus cucullatus sp. nov.*Types*

Holotype: male, '2 km N Mt Molloy Qld. 5.2.97 C. Watts', SAMA.

Paratypes: 3, same data as holotype, SAMA; 1, 'Peach Ck. N. Qld. 24/7/82 C. Watts', SAMA; 3, '(19°10S 145°47E) Running River, Q 24 km W, of Paluma, 13.1.70, pools in sandy river bed Britton & Misko', ANIC; 3, 'Kambah Pool ACT 26/11/98 C. Watts' SAMA.

Description (number of specimens examined, 11) Fig. 23

Length 2.3 – 3.5mm. Broadly elongate, widest just behind middle of elytra. Head black with greenish iridescence; pronotum dark testaceous with lighter front edge; elytra steely grey to dark testaceous with small darker spots, spots near suture approximately same size, spot over plica tending to be stronger; ventral surface testaceous to black, legs testaceous, apex of tarsi darker. Head sparsely granulate/punctate, epicranial suture weak. Pronotum with quite dense, strong deep punctures, smaller and more rugose at sides, surface uneven, front edge thickened, raised, forming a weak hood over neck of head. Elytra with relatively strong punctures, separated within striae by same width or less than interstriae, interstriae two and four weakly to moderately raised, more strongly near base and again near middle, interstria eight moderately raised in front of plica and incorporating plica. Pronotal epipleuron moderately delineated, about two to three punctures deep, often fluted. Front of mesosternum in middle with two narrow longitudinal carinae, area between them quite deep, pseudoepipleuron weak to moderate, elytral epipleuron absent behind, very narrow in middle widening to about same size as pseudoepipleuron in front third. Profemur elongate, basal pubescence weak, reduced to narrow band ventrally. Mesofemur spindle shaped, narrowing toward base to between one third and one half its greatest width; basal pubescence moderate, reaching a little beyond end of trochanter. Metafemur somewhat thicker and less spindle shaped than mesofemur.

Male: Basal piece of aedeagus broad, narrowing a bit towards base, 1.6 – 1.7 times

length of apical piece. Parameres bulbous at base, narrow and paddle-shaped in apical half. Central lobe broad, much shorter than parameres, leaving gap in front of it between the parameres (Fig. 23).

*Distribution***Australian Capital Territory**

Kambah Pool, SAMA.

Queensland

2 km N Mt Molloy, SAMA; 24 km W Paluma, ANIC; Peach Creek, SAMA.

Remarks

A seemingly rare species relatively close to *H. burdekinensis*. It differs from this species by the more uneven, almost foveate, pronotum and the greater tendency for the elytral interstriae to be raised. The raised, thickened front edge of the pronotum in *H. cucullatus* is distinctive, as is the male genitalia with wide basal piece, short central lobe and paddle-shaped tips to the parameres. The aedeagus most closely resemble that of *H. interioris* but in that species the parameres are shorter and the central lobe comparatively longer. Otherwise *H. interioris* is uniformly iridescent on the dorsal surface, has dark legs, lacks forms with testaceous ventral surface, often has the pronotum with foveae and lacks the raised front margin of the pronotum.

The testaceous ventral surface, raised interstriae, raised front margin of pronotum and aedeagus will separate it from the other species with wholly testaceous legs.

Biology

The few known specimens have been taken at the edge of sandy rivers or in sandy areas at the edge of ponds.

Etymology

Latin. 'Hooded' – in reference to the raised hood-like front edge of the prothorax.

Hydrochus decorus sp. nov.*Types*

Holotype: male, 'Qld Greenvale 70 km SW at light 14–24 Mar. 1995 A. J. Watts', SAMA.

Paratypes: 28, same data as holotype, SAMA; 11, same data as holotype except 12–21 Apr., SAMA.

Description (number of specimens examined, 72)
Fig. 16

Length 2.3 – 3.4mm. Relatively broad, elytra widening behind middle, rapidly narrowing to apex. Dorsal surface shiny, usually with strong greenish golden reflections; elytra typically with three to four darker spots near suture, one on shoulder and one on plica, anterior sutural spot usually largest. Ventral surface brown to dark brown, legs light to moderately testaceous, parts of tarsi, knees and parts of femora darker. Setae absent from dorsal surface, or virtually so. Head strongly granulate/punctate, epicranial suture weakly to moderately developed. Pronotum dorsally granulate/punctate, foveae weakly developed. Elytra with moderate, rather evenly sized punctures, interstriae granulate to varying degrees, alternate interstriae weakly to moderately developed, plica incorporated into interstria eight. Pronotal epipleuron moderately well marked, one to two puncture widths wide. Elytral epipleuron broad to very broad, narrowing rapidly in apical fifth, lacking pseudoepipleuron. Front of mesosternum in middle with two weakly raised longitudinal carinae, area between them with vague raised portions in a rough cross shape. Profemur stout, rapidly narrowing to base, basal pubescence weak, virtually lacking ventrally. Mesofemur extremely spindle-shaped with narrow basal portion about one third of greatest width, basal pubescence weak, in very narrow band along junction with trochanter ventrally. Metafemur elongate, narrowing basally to about half greatest width.

Male: Basal piece of aedeagus long, parallel sided or narrowing at base, sometimes weakly twisted, 1.5 – 1.7 times length of apical piece. Apical piece narrow at base, widening to middle then narrowing to sharp point. Central lobe moderately broad, a little shorter than parameres (Fig.16).

Distribution

Northern Territory

5 km SE Mt Borradaile Station, SAMA; Morianty Creek, SAMA; Palm Creek, NTM; Roderick Creek, Gregory N P, NTM.

Queensland

Burdekin River near Charters Towers, SAMA; Bushland Beach, 20 km N Townsville, SAMA; Dalrymple, 30 km N Charters Towers, NHMW; Einasleigh River, DPIM; 70 km S Greenvale, SAMA; Laura, SAMA; Mitchell River, DPIM; Mt Mulligan, DPIM; 16°28S 144°46E, ANIC.

Western Australia

Fitzroy River, ANIC; 12 km S Kalumburu, ANIC; 4 km W King Cascade, ANIC; 6.5 km N Mt Bell, WAM; 3 ml E Pago Mission, FIELD; Synnot Creek, ANIC.

Remarks

Hydrochus decorus is close to *H. eurypleuron* but the majority of specimens of *H. decorus* can be separated from *H. eurypleuron* by their broader shape, bright green/golden colour and darker spots on elytra. The aedeagus of *H. decorus* is unusual in having the base of the parameres narrower than the middle, otherwise there is little difference between the two species. In occasional specimens the colour is generally duller and the elytral spots indistinct. These can be difficult to distinguish from *H. eurypleuron* except by the aedeagi. The occasional specimen of *H. interioris* can be mistaken for *H. decorus* (or *H. eurypleuron*) but these have a more extensive development of the pseudoepipleura, are generally narrower and lack or virtually lack granulation on the pronotum and elytra.

Biology

I have collected this species from sandy areas at the side of moderate to large rivers in similar habitat to *H. burdekinensis* and *H. lateviridis*. Taken at light.

Etymology

Latin. 'splendid' – in reference to the bright green jewel-like qualities of some specimens.

Hydrochus eurypleuron sp. nov.

Types

Holotype: male, 'Qld. Greenvale 70 km SW at light 12–21 Apr 1995 A. J. Watts', SAMA.

Paratypes: 11, same data as holotype, SAMA; 12, same data as holotype except 14–24 Mar, SAMA.

Description (number of specimens examined, 50)
Figs 8,17

Length 1.8 – 2.7mm. Moderately elongate, elytra widened behind middle, rapidly narrowing to apex, weakly to quite strongly serrate laterally. Dorsal surface dark brown to black; ventral surface dark brown to black; legs light to moderately testaceous, parts of tarsi and femora often darker. Head strongly granulate, pronotum densely and strongly granulate/punctate, foveae

indistinct, shallow. Epicranial suture weakly to moderately impressed. Elytral punctures moderate, even sized over most of elytra, interstriae weakly to strongly granulate, alternate interstriae moderately raised, particularly towards apex and interstria eight, plica incorporated into interstria eight. Front of head and apex of elytra with weak-moderate setae. Pronotal epipleuron moderate, very poorly differentiated from top of pronotum. Pseudoepipleuron absent or weakly developed at apex only, elytral epipleuron wide, narrowing rapidly towards extreme apex. Front of mesosternum in the middle relatively smooth but with two short longitudinal carinae just traceable. Profemur stout but rapidly narrowing basally to less than half its greatest width, basal pubescence weak, reduced to a narrow band ventrally. Mesofemur elongate, becoming very narrow basally, basal pubescence weak stretching in a narrow band along junction with trochanter ventrally. Metafemur elongate, narrowing towards base to about half greatest width.

Male: Basal piece of aedeagus weakly twisted, narrowing near base, 1.5 – 1.7 times length of apical piece. Apical piece narrow, bullet shaped or weakly constricted towards apex. Central lobe narrow, nearly as long as parameres (Fig. 17).

Distribution

Northern Territory

Barramundi Gorge, Kakadu NP, CLH, NHMW; 8 km ESE Cape Crawford, ANIC; Edith Falls near Katherine, CAL; Katherine Gorge, DPIM; Kongarra, ANIC; 8 km ENE Victoria River Downs, ANIC.

Queensland

Boggy Creek near Cooktown, ANIC; Burdekin River, SAMA; 20 km NW Charters Towers, NHMW; Einasleigh River, DPIM; 70 km S Greenvale, SAMA; Iron Range, ANIC; Laura, DPIM; 21 km E Mareeba, DPIM; 23 km N Mareeba, DPIM; Palm Creek, DPIM; 5 km SE Mt Borradaile Station, SAMA; Reid River near Mingela, SAMA; 15 km NNW South Johnstone, DPIM; Tolga, DPIM.

Western Australia

Carson Escarpment, ANIC; Fitzroy River, ANIC; 14 km S by W Kalumburu Mission, ANIC; King Edward River, ANIC; Millstream, ANIC; 3 km NW Millstream, ANIC; 1 km NNE Millstream, ANIC; Mining camp Mitchell Plateau, ANIC; 4 km S by W Mining camp Mitchell

Plateau, ANIC; Synnot Creek, ANIC; Wittenoom Gorge, CAL.

Remarks

Most readily separated from the closely related *H. decorus* by its duller dorsal colour and lack of elytral spots. In an occasional specimen, mostly from the Kimberley, vague dark spots can be seen in certain lights. In general it is a narrow species and does not reach the broad form with strongly serrated elytral edges quite frequent in *H. decorus*. Some specimens of *H. interioris* could be confused with this species due to their comparatively well developed elytral epipleura and weak pseudoepipleura. Apart from the presence of the pseudoepipleura, these lack, or virtually lack, granules on the pronotum and elytra and usually have quite well marked spots on the elytra.

Biology

The little habitat information available suggests that this species lives at the edge of small to moderate-sized sandy rivers. Taken at light.

Etymology

Greek. 'wide ribbed' – in reference to the very broad epipleura in this species.

Hydrochus interioris Blackburn

Hydrochus interioris Blackburn, 1896

Types

Lectotype: 'Ellery Cr' 'Cent-Aust Coll Horn Pres 7-97' 'Hydrochus interioris Blackb.', with more recent red labels 'Type' 'Syntype T-13206 Hydrochus interioris Blackburn, 1896', NMV. Herein designated.

Paralectotypes: 1 'Paisley Bluff Cent. Aust. Horn Exp.' 'Hydrochus interioris Blk del by Blkb' 'F.E. Wilson Collection' with more recent blue labels '2296 Cotype' 'Paratype T-2296 Hydrochus interioris Blackb', NMV; 1, '5489 Paisly, Bl' 'Hydrochus Horni Bl Co-t' 'Id by A.M. Lea Griffith Collection' 'Really is interioris Bl made a mistake in labelling co-types', SAMA; 1, '5489 Paisly Bl' 'Hydrochus Horni Blackb Co-type', SAMA; 1, '5489 Paisly Bl' 'Horni, Blackb' 'this is interioris, Bl', SAMA. Herein designated. I agree with Lea's comments on the SAMA specimens. See also Lea (1926). In NMV there are additional specimens obviously collected and labelled at the same time as the ones later labelled

as cotypes. I am unaware why some have been labelled as cotypes and others not. The SAMA cotypes were labelled as such by Blackburn albeit incorrectly.

Description (number of specimens examined, 261) Figs 5, 20–22

Length 2.1 – 3.3mm. Narrowly to moderately elongate, elytra widened slightly to considerably behind middle, narrowing quite rapidly to apex. Head black/silvery/golden; pronotum black often with bright silver reflections; elytra dark brown-black, often with bright silver or occasionally golden reflections, black spots visible to varying degrees dependent on background colour; ventral surface dark brown; legs testaceous, parts of tarsi and femora darker. Head granulate/punctate, epicranial suture weakly to moderately impressed. Pronotum rugose/punctate to granulate. Elytra with moderate punctures, distance between them within striae same as distance between striae, granules absent to strong, apical punctures often well marked; elytral interstriae not or only slightly raised. Setae on head and apex of elytra weakly to moderately developed. Pronotal epipleuron moderately developed, two to three punctures deep, fluted. Pseudoepipleuron moderately to well developed, elytral epipleuron absent behind, increasing in front to about equal width of pseudoepipleuron. Front of mesosternum in middle with two longitudinal carinae, area between them deeper in front than behind. Profemur quite stout, narrowing to about half its greatest width basally, basal pubescence weak reduced to a narrow band ventrally. Mesofemur elongate, spindle-shaped, reduced to about half its greatest width in basal third, basal pubescence weak, reduced to narrow band ventrally, usually less than a quarter of its basal width. Metafemur elongate, bowed on front edge, reduced to almost half its greatest width near base.

Male: Basal piece of aedeagus straight sided, 1.5 – 2.6 times apical piece. Apical piece varying from elongate triangular to bullet-shaped. Parameres narrowly to moderately broad apically. Central lobe rather narrow to moderately wide, shorter than parameres, tip rounded, occasionally with a hint of a twist at tip (Figs 20–22).

Distribution

Northern Territory

32 km W Alice Springs, ANIC; Barramundi Creek, Kakadu NP, SAMA; Barramundi Gorge, Kakadu NP, NHMW, CLH; 22 km WSW

Borrooloola, ANIC; 80 km SW Borrooloola, ANIC; 8 km ESE Cape Crawford, ANIC; 14 km NW Cape Crawford, ANIC; Cooper Creek near Mt Borradaile, SAMA; Ellery Gorge, ANIC, SAMA, NMV; 11 km E Jabiru, SAMA; 20 km SSW Jabiru, SAMA; Jim Jim Highway, Kakadu NP, NHWM, CLH; Jim Jim Falls, Kakadu NP, NHWM, 1 km W Gubara, Kakadu NP, SAMA; Gungurul Lookout, Kakadu, NHWM; Howard Springs, ANIC, SAMA; Kongarra, ANIC, NTM; Litchfield NP, ANIC; 1 km NNW Mudginbarry Homestead ANIC; 19 km E by S Mt Borradaile, ANIC, NTM; 6 km SE Mt Borradaile, SAMA; 19 km WSW Mt Cahill, ANIC; 8 km E Mt Cahill, ANIC; Nabarlek Dam, ANIC; 46 km WSW Mt Cahill, ANIC; 15 km E Mt Cahill, NTM; Nawurlandja, Kakadu NP, SAMA; 18 km E by N Oenpelli, ANIC; Ormiston Gorge, SAMA; Paisley Bluff, NMV; Pine Creek, NTM; Roderick Creek, NTM; Simpsons Gap, SAMA; UDP Falls, Kakadu NP, NTM; Vaughan Springs, SAMA.

Queensland

20 km S Bloomfield, SAMA; Burdekin River, SAMA; Burdekin River E of Charters Towers, SAMA; 30 ml N Cooktown, UQIC; Coen, SAMA; 24 ml SE Einasleigh, CAL; 70 km SW Greenvale, SAMA; Iron Range, UQIC; McLeod River near Cooktown, SAMA; McIlwraith Ranges Weather Station, SAMA

Western Australia

Drysdale River, ANIC; 12 km S Kalumburu Mission, ANIC; 14 km S by E Kalumburu Mission, ANIC; 4 km W King Cascade, ANIC; King Edward Range, ANIC; Mining Camp Mitchell Plateau, ANIC; 4 km WSW Mining Camp Mitchell Plateau, ANIC.

Remarks

As I have interpreted it, *H. interioris* is a common, widespread and variable species across northern and central Australia. It does not appear to be present east of the Dividing Range. In the Kimberley and coastal Northern Territory most specimens are narrow, weakly granulate, often with a silvery or less frequently a golden sheen and their aedeagi are relatively broad. At the eastern edge of their range on Cape York, Queensland, they are strongly granulate and often broad, with narrower more elongate aedeagi, and darker although when wet the typical dark spots and silvery patches are usually clear. The type population in central Australia tends to be intermediate.

Hydrochus interioris can most easily be separated from related species by its dark legs, uneven surface to the pronotum, narrow mesofemur but only moderately narrowed metafemur, weak basal pubescence on mesofemur, the frequent presence of moderate apical punctures, often silvery elytra with simple but often masked pattern of dark spots and, particularly in Queensland specimens, very strong dorsal granules. The aedeagus is unusual in having the basal half of the parameres often swollen ventrally rather than the more usual dorsally.

It can be confused with *H. macroaquilonius* (see under that species) and *H. eurypleuron* which is superficially similar but has much broader elytral epipleura, and *H. aenigmatis*, a more southerly species, with broader mesofemora with stronger basal pubescence, elytra and pronotum not granulate and with a very broad short central lobe to the aedeagus. Small specimens are difficult to distinguish from *H. atratus* (see under that species).

Biological

This common and widespread species is found in bare sandy areas beside creeks and rivers or the pools left in drying river beds. Taken at light.

Hydrochus lateviridis Blackburn

Hydrochus lateviridis Blackburn, 1896

Type

Holotype: male 'Ellery ck' 'Cent. Aust. Coll. Horn Exp. Pres. 8.98' 'Hydrochus lateviridis Blackb' with more recent red labels 'Type' 'Holotype T-13211 Hydrochus lateviridis Blackburn, 1896', NMV.

Description (number of specimens examined, 290) Figs 9, 10, 25–27

Length 1.6 – 2.5mm. Broadly elongate, pronotum narrowed quite strongly behind, elytra quite strongly widened behind middle, rapidly narrowing to tip. Head black to golden, iridescent; pronotum dark brown to golden iridescent, front and rear margins occasionally narrowly testaceous; elytra dark brown, or steely grey, or silvery/golden, elytral dark spots often well marked, often extensive (Figs 9,10); ventral surface dark brown to black, legs yellow or light testaceous, usually lacking darker areas on knees or femora. Head granulate/punctate, epicranial

suture weakly impressed. Pronotum rather evenly and smoothly covered in small to moderately sized punctures, moderately rugose. Elytra with small to medium sized punctures, distance between punctures often less than the width of interstriae, interstriae not or only very weakly raised; plica distinct; apical punctures small, may be weakly granulate. Setae on head and elytra virtually absent. Pronotal epipleuron well marked, two to three puncture widths deep, smooth with some large punctures. Elytral pseudoepipleura weak to moderate, epipleura absent behind, widening to about same width or a bit more than pseudoepipleura in front third. Front of mesosternum in centre with two longitudinal carinae, area between them shallow behind. Profemur elongate, narrowing toward base; basally pubescence weak, reduced to narrow band ventrally. Mesofemur strongly spindle-shaped, reducing to half or less its maximum width basally, basal pubescence very weak, reduced to narrow band ventrally. Metafemur spindle-shaped, narrowing to about half its greatest width basally.

Male: Basal piece of aedeagus straight sided to moderately twisted, 1.5 – 2.6 times length of apical piece. Apical piece bullet-shaped to elongate, occasionally twisted, base narrower than basal piece. Central lobe varying from relatively thin and parallel sided to quite strongly expanded apically, in both cases with a very thin apical piece which almost reaches tip, often bulging above parameres apically. The thin apical piece of the central lobe may be displaced laterally in strongly twisted or elongate forms (Figs 25–27).

Distribution

Northern Territory

Adelaide River, ANIC; Barramundi Creek, Kakadu NP, SAMA; Deaf Adder Gorge, Kakadu NP, NTM; 14 km NW Cape Crawford, ANIC; Cooper Creek near Mt Borradaile, SAMA; Edith Falls near Katherine, CAL; Ellery Gorge, ANIC; Gubara, Kakadu NP, NHMW, CLH; 20 km SSW Jabiru, SAMA; Kongarra, NTM; 19 km E by S Mt Borradaile, NTM, ANIC; 6 km SE Mt Borradaile, SAMA; 6 km E Mt Cahill, ANIC; 8 km E Mt Cahill, ANIC; 19 km WSW Mt Cahill, ANIC; 5 km SE Mt Borradaile Station, SAMA; 2 km N Mudginbarry Homestead, ANIC; 9 km SSE Mudginbarry Homestead, ANIC; 11 km S by W Nimbuwah Rock, ANIC, NTM; Nawurlandja, Kakadu NP, SAMA; 6 km SW by S Oenpelli,

ANIC; Roderick Creek, NTM; Simpsons Gap, SAMA; South Johnstone River, Kakadu NP, SAMA; UDP Falls, Kakadu NP, NTM; Woolwonga Fauna Reserve, ANIC; 16.07S 130.25E, NTM.

Queensland

Borumba Dam, NHMW; Burdekin River, SAMA; Burdekin River E of Charters Towers, SAMA; 35 ml SE Burketown, UQIC; Cape Tribulation, DPIM; Dalrymple, NHMW; Funnel Creek, ANIC; 70 km SW Greenvale, SAMA; Hann River, NMV; Laura, DPIM; 73 km NW Laura, ANIC; 66 km NW Mt Isa, ANIC; 3 km ENE Mt Tozer, ANIC; Normanton, ANIC; 11 km NSW Petford, DPIM; 15 km WNW South Johnstone, DPIM; Windsor Table Land, DPIM.

Western Australia

Abydos, FIELD; Cadjeput Rockhole, WAM; 17 km N by E Cane River Homestead, ANIC; Drysdale River, ANIC; 12 km S Kalumburu Mission, ANIC; 3 km NW by W Millstream, ANIC; 4 km S by W Mining Camp Mitchell Plateau, (14°52S 125°50E), ANIC; 5.5 km NW Mt Bell, WAM; West Peawah River, ANIC; Winjana Gorge, CAL.; 13 km ESE Wittenoom, ANIC; Synnot Creek, ANIC.

Remarks

Typical *H. lateviridis* have a large triangular dark patch just before the middle of the elytra which separates them from all other Australian *Hydrochus* (Figs 9,10). However this patch can be obscured in dark specimens and, particularly in Arnhem Land, can be reduced to a small area no larger than other patches on the elytra which then resembles the pattern in other species such as *H. burdekinensis*. Dark specimens of *H. lateviridis* can be confused with *H. atratus*, particularly the occasional specimen of *H. atratus* with yellow legs, but can be separated by their wider elytral epipleura, more spindle-shaped mesofemora, and better defined pronotal epipleura. All these characters are subjective and can only really be appreciated when directly comparing specimens. The genitalia can be very similar but in *H. atratus* (Fig.19) the apical piece is more triangular and with a narrower central lobe than in *H. lateviridis*. In some *H. atratus* (if the specimens from Kunmunya are included in that species) (Figs 25–27) the apical piece is very like the short narrow form of *H. lateviridis* (Fig. 26) but is more waisted and the central lobe not bulbous as in typical *H. lateviridis*.

Darker specimens of *H. burdekinensis*, and *H. lateviridis* with poorly developed colour patterns, resemble each other. In most cases the more spindle-shaped mesofemora of *H. lateviridis* will separate them. Their aedeagi are relatively similar and the large degree of variation makes it difficult to reliably separate them on this character alone.

There are four rather distinctive forms of the aedeagus within the species as I interpret it.

The first form has a squat, bullet-shaped apical piece with a broad, bulbous central lobe with a weak, hard to see, apical spine (Fig. 25). It appears to be a more inland form and is the only one present in the type locality in Central Australia.

The second form has a short, thin apical piece with a narrow almost parallel sided central lobe (Fig. 26). It is more coastal in distribution.

The third form is similar to the second but has the apical piece strongly skewed, and the thin portion at the tip of the central lobe can appear twisted out of position. The few specimens known are from the Hann River/Iron Range area of Cape York.

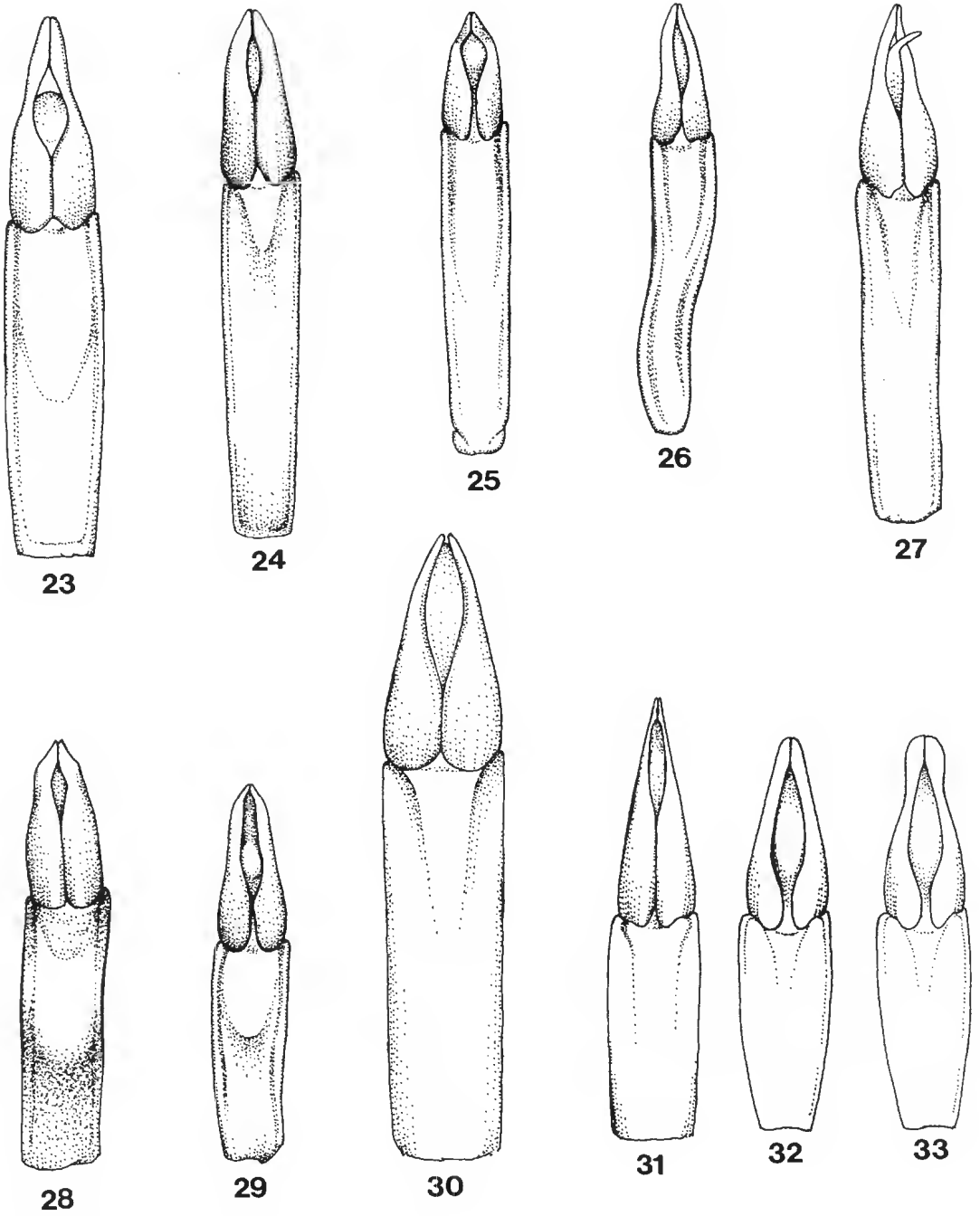
The fourth form has a longer more elongate apical piece with a correspondingly long thin central lobe, the terminal piece of which is bent at right angles in the four known specimens, presumably a post-mortem effect (Fig. 27). The specimens are from Cooktown, Hann River, Wenlock River and Archer River all on Cape York.

The first two forms are relatively common and widespread, occurring together in the same population at several locations (e.g. Greenvale and Kakadu). Although most specimens are clearly one or the other form enough intermediates exist for me to hesitate to consider them separate species.

Forms three and four are known from only a few specimens from a relatively restricted area of Cape York and are the only representatives of the species in the region so far collected. A few specimens from further south show a tendency to have a skewed apical piece to their aedeagi. Many more examples of *H. lateviridis* from Cape York will need to be examined before a better interpretation of these forms can be made.

Biology

Found in sand and gravel at the edges of rivers or in sandy pools in the beds of drying rivers. Taken at light.



FIGURES 23-33. 23, *H. cucullatus*; 24, *H. burdekinensis*; 25-27, forms of *H. lateviridis*; 28, *H. simplicicollis*; 29, *H. obsoletus*; 30, *H. numerosepunctatus*; 31-33, forms of *H. obsкуроaeneus*.

Hydrochus macroaquilonius* sp.nov.*Types**

Holotype: male, 'NT Magela ck Kakadu NP 19.3.98 C.H.S. Watts', SAMA.

Paratypes: 5, same data as holotype, SAMA; 2, '12°57S 132°33E Jim Jim Creek, N.T. 19 km WSW of Mt Cahill 24.x.72, E.B. Britton', ANIC; 2, '12°40S 132°54E Magela Creek, N.T. 9 km SSE of Mudginbarry HS, 6.xi, 72, at light, E. Britton', ANIC.

Description (number of specimens examined, 47)
Fig. 15

Length 3.2 – 4.1mm. Elongate, elytra widest slightly behind middle, narrowing quite rapidly to apex which is moderately truncate. Head dark brown-black with metallic sheen; pronotum dark brown/steely grey; elytra dark brown/steely grey/golden with dark spots which are masked in darker forms; ventral surface dark brown-black, legs testaceous, knees and base of femora often darker. Head quite densely but smoothly granulate/punctate, epicranial suture weak. Pronotum rugose/punctate, punctures relatively small and dense, foveae weak. Elytral punctures moderate, separated within striae by about width of interstriae, interstriae four and eight often weakly raised, plica present. Head and elytra virtually without setae. Pronotal epipleuron ill defined, one to two puncture widths wide, may be weakly fluted. Elytral pseudoepipleuron moderate, epipleuron absent apically, increasing towards middle and front where it reaches about same width as pseudoepipleuron. Front of mesosternum in middle with two longitudinal carinae, area between them often shallow. Profemur elongate, basal pubescence weak, reduced to narrow band ventrally. Mesofemur elongate, spindle shaped, towards base less than half its greatest width, basal pubescence moderate, reaching to about quarter width of femur beyond trochanter on rear edge. Metafemur elongate, weakly bowed on front edge.

Male: Basal piece of aedeagus parallel sided, 2.0 – 2.1 times length of apical portion. Apical piece elongate, narrow. Central lobe narrow, almost as long as parameres (Fig. 15).

Distribution**Northern Territory**

Barramundi Creek, Kakadu NP, CLH, NHMW; Gungural Lookout, Kakadu NP, NHMW; 20 km SSW Jabiru, SAMA; Jim Jim Creek, Kakadu NP,

ANIC; Magela Creek, Kakadu NP, SAMA; 30 km WSW Mt Cahill. ANIC; 8 km E Mt Cahill, ANIC; 9 km SSE Mudginbarry Homestead, Kakadu NP, ANIC; South Johnstone River, Old Jim Jim Road Crossing, Kakadu NP, SAMA.

Queensland

3 km W by S Black Mountain, ANIC; 20 km S Bloomfield, SAMA; Captain Billy Creek, SAMA; Coen, UQIC; Helenvale, SAMA; 7 km N of Hope Vale Mission, ANIC; Iron Range, DPIM; 73 km NW by W Laura, ANIC; Palm Creek, DPIM; Peach Creek, SAMA; McIlwraith Ranges Weather Station, SAMA; 9 km ENE Mt Tozer, ANIC; 11 km ENE Mt Tozer, ANIC; 3 km ENE Mt Tozer, ANIC; 1 km N Rounded Hill, ANIC; 5 km W by N Rounded Hill, ANIC.

Western Australia

8 km SW by W Cane River Homestead, ANIC; Gascoyne River, SAMA; 23 ml N Mundiwindi, WAM.

Remarks

One of the largest Australian *Hydrochus*, *H. macroaquilonius* is close to *H. interioris*. It differs in its larger size, lack of granules, somewhat more extensive basal pubescence on the mesofemur with the pubescence reaching beyond the hind edge of the trochanter even in the middle of the femur. In *H. interioris* it is seldom as well developed. The aedeagus resembles that seen in some of the highly granulate eastern specimens of *H. interioris* but has the central lobe a bit broader and longer than most of these. The epipleura also tend to be broader than in the majority of *H. interioris*. Most specimens have the legs with a much lesser extent of dark colour than in *H. interioris* and in a few specimens the legs are uniformly testaceous. The bright golden dorsal surface seems a rarity in this species, most specimens being a rather dull grey with the spots only vaguely visible. In general appearance it resembles *H. imamkhani* another large species with elytral spots, and sympatric with it. The structure of the front of the mesosternum will readily separate these two species.

Biology

Found among sand and gravel at the edges of rivers and small creeks. Taken at light.

Etymology

Latin. 'Large', 'northern' – a reference to its size and locality.

Hydrochus obsoletus Lea*Hydrochus obsoletus* Lca, 1926

Type

Holotype: female 'obsoletus' Lea TYPE Albany', SAMA*Description* (number of specimens examined, 170) Fig. 29

Length 2.0 – 3.4 mm. Broadly elongate, widest just behind middle of elytra. Head black or golden, weakly iridescent; pronotum testaceous to dark testaceous with green tinges, front and/or rear margins sometimes narrowly testaceous, or golden, or all black; elytra light testaceous with vague similar sized darker spots, or shiny silver grey with darker spots, or shiny golden with dark spots, or shiny black; ventral surface black, legs light testaceous with tips of tarsi, and occasionally base of femora diffusely darker. Head smooth, sparsely covered with small moderate punctures, frons area often granulate, epicranial suture weak. Pronotum smooth, rather sparsely covered with moderate punctures to rugose and closely punctured. Elytra with small to moderate punctures, separated within striae by the width or less of the adjacent interstriae, sometimes weakly granulated at sides and rear; interstriae not or only weakly raised – if so then interstria four is most prominent; plica weak to moderate. Dorsal setae absent. Pronotal epipleuron well marked, shiny, two to three puncture widths deep. Front of mesosternum in middle with two longitudinal carinae, area between them shallower behind. Pseudoepipleuron relatively broad, epipleuron absent behind, narrow in middle, widening to a bit less than width of pseudoepipleuron in front third. Profemur quite stout; basal pubescence weak, reduced to a narrow band ventrally. Mesofemur relatively stout for group 2 species, narrowing to about two thirds its greatest width basally, basal pubescence weak to moderate, reduced to narrow band about a quarter width of base of femur or less, ventrally. Metafemur a bit larger but similar in shape to mesofemur.

Male: Basal piece of aedeagus narrowing weakly toward base, 1.5 – 2.0 times length of apical piece. Apical piece narrowly bullet-shaped to triangular with suggestion of subapical constriction. Central lobe relatively narrow, weakly bulbous in its central portion, a bit shorter than parameres (Fig. 29).

*Distribution***Australian Capital Territory**

Black Mountain, ANIC; Canberra, SAMA; 30 km SW Canberra, SAMA; Kambah Pool, ANIC, SAMA.

New South Wales

Armadale, SAMA; Bombala, SAMA; Boonoo Boonoo River, UQIC; Cabbage Tree Creek near Nelligen, SAMA; Clarence River, NMV; Cooma, SAMA; Gilgandra, SAMA; Jenolan Caves, SAMA; 6 km N Uralla, ANIC; Valery, ANIC; Quaama, SAMA.

Queensland

Bowen, SAMA; 15 km W Gympie, NMV; Kenilworth State Forest, UQIC; 10 km W Imbil, NMV.

South Australia

Cudlee Creek, SAMA; Torrens Gorge, SAMA.

Victoria

11.5 km NNW Ballan, ANIC; Benong, CAL; 3.8 km WNW Blackwood, ANIC; Deddick River, NMV; 4.5 km SW Healesville FIELD; 4 km SW Healesville, NMV; Omeo, SAMA; 30 km N Orbost, SAMA; Stratford, SAMA.; Tambo Crossing, Jordan River, NMV.

Remarks

A southern species readily recognised from other southern species by its yellow spindly legs and coloured and spotted elytra. It resembles *H. burdekinensis* in general shape and colour but can be separated from this species by its similarly shaped meso and meta femora unlike *H. burdekinensis* which has the mesofemora more spindle-shaped. Although some *H. obsoletus* and some *H. burdekinensis* have identical dorsal colouring, apart from one specimen of *H. obsoletus* from Gilgandra, in SAMA, with a testaceous ventral surface, *H. obsoletus* always has a black, or very dark, ventral surface, whereas in most *H. burdekinensis* it is a much lighter testaceous colour. The aedeagi of both species are quite similar but in *H. obsoletus* the apical piece is comparatively longer (1.5 – 2.0 times the length of the basal piece) and the paramere tips a bit wider.

Hydrochus obsoletus closely resembles *H. simplicicollis* and can only be reliably separated by its aedeagus which has a relatively shorter apical piece compared to *H. simplicicollis* (Figs 28, 29). Future study, particularly of specimens

from coastal Queensland, may well show these two species to be conspecific.

Biology

All specimens of this species that I have collected have been taken from among gravel at the edge of relatively large streams/rivers.

Hydrochus simplicicollis Lea

Hydrochus simplicicollis Lea, 1926

= *Hydrochus verae* Makhan, 1995; syn. nov.

Types

Hydrochus simplicicollis Lea. *Lectotype*: 'simplicicollis Lea TYPE Cairns' left hand specimen of two on same card with 'TY' below, SAMA. Herein designated.

Paralectotypes: 1, same data as holotype, SAMA; 1, 'Vicinity of Jenolan Caves (J.C. Wiburd)' 'Co-type' 'Griffith Collection Id. by A.M. Lea', SAMA. Herein designated. This specimen is labelled as a co-type but not by Lea. In the original description it is mentioned by Lea as 'probably belongs to the species'. Its paralectotype status is doubtful. This specimen belongs to *H. obsoletus*.

Hydrochus verae Makhan. *Holotype*: 'Australien QL (10,11) Dalrymple 300 m, 30 km N. Charters Towers 18.1.1993 leg Wewalka' 'Hydrochus verae det. D. Makhan 1994' with red Holotype label, NHMW.

Paratypes: 7, same data as holotype with yellow paratype labels, NHMW. (The paratype series includes three species; four are conspecific with the holotype, two are *H. lateviridis* and one is *H. atratus*).

Description (number of dissected males examined, 14) Fig. 28

Length 2.0 – 2.4mm. Broadly oval, widest just behind middle of elytra. Head black, often with greenish tinges; pronotum shiny dark brown, front and rear edges often narrowly testaceous; elytra light to dark testaceous, sometimes with vague darker spots approximately equal in size, or grey/black, or black; ventral surface dark brown to black, legs light testaceous, apical portion of tarsi maybe darker. Head smooth with sparse moderate punctures, occasionally with squat granules, epicranial suture weak. Pronotum smooth to rugose, punctures moderate sized, usually rather

sparse. Elytra with small, moderate sized punctures, punctures separated by less than the width of interstriae in all but a few cases; interstriae not, or only very weakly raised; plica weakly distinct. Dorsal surface without setae. Pronotal epipleuron well differentiated, shiny, about three puncture widths deep. Pseudoepipleuron of elytra moderate, epipleuron absent behind, narrow in middle, increasing to about same width as pseudoepipleuron in anterior third. Front of mesosternum in middle with two longitudinal carinae, area between them shallower behind. Profemur relatively stout; basal pubescence moderate, reduced to a band about a quarter the width of the femur at that point or less ventrally. Mesofemur moderately spindle-shaped, narrowing basally to between a third to a half its greatest width; basal pubescence weak to moderate, reduced to a narrow band about a quarter of the width of the femur or less ventrally. Metafemur a little larger but approximately the same shape as mesofemur.

Male: Basal piece of aedeagus wide, narrowing a bit towards base, 1.0 – 1.4 times length of apical piece. Apical piece elongate, narrow. Central lobe rather narrow, weakly bulbous in its central portion, as long as parameres (Fig. 28).

Distribution

Queensland

Cairns, SAMA; Dalrymple, 30 km N Charters Towers, NHMW; 70 km SW Greenvale, SAMA; 15 km WNW South Johnstone, DPIM; Windsor Tableland, DPIM.

Western Australia

3 ml E Pago Mission, FIELD.

Remarks

Like the related species, *H. obsoletus*, *H. lateviridis* and *H. burdekinensis*, *H. simplicicollis* has a range of dorsal colours but in all known specimens the pronotum is dark, apart from front and rear margins in some, and the ventral surface black or almost so and, when present, the elytral spots are roughly equal in size. Although most specimens have small elytral punctures and wide interstriae, in some specimens the punctures are larger with the interstriae narrow and equal in width to the area separating punctures within a stria. Compared to *H. burdekinensis* and *H. lateviridis*, the mesofemora are relatively stout and roughly similar in shape to the metafemora. On average the elytral epipleura seem a bit wider than in related

species but this difference is difficult to quantify. Males have longer and narrower apical pieces to their aedeagi than those of *H. burdekinensis* (Fig. 24) or *H. lateviridis* (Figs 25–27).

The species can only be separated from the southern *H. obsoletus* by the aedeagus which, in *H. obsoletus* (Fig. 29), has the apical piece comparatively shorter and broader and the central lobe is shorter and does not reach to the ends of the parameres. It is possible that the collection of specimens from the intermediate geographic areas could show them to be conspecific.

Hydrochus verae Makhan belongs to this species, although three of the seven paratypes do not. The specimens mentioned by Lea (1926) from Jenolan NSW and Bowen Qld are *H. obsoletus*.

Biology

No habitat notes are available although the general localities suggest that it lives at the edge of sandy/gravelly rivers as do related species.

Species Group 3

Group 3 species are characterised by having: two rather than three longitudinal carinae at the front of the mesosternum; stout, almost cylindrical legs, with the basal pubescence on the profemora interrupted ventrally or reduced to a very narrow band (Fig. 3). Other character states that tend to define the group are: elytral interstriae, particularly the alternative ones, usually raised and the plica absorbed into interstria eight; pronotal foveae weakly to moderately developed and their edges often glabrous; pronotal epipleura moderately wide but ill-defined; head with a deep epicranial suture; dorsal setae often strong; basal pubescence on the mesofemora seldom reaches beyond the apex of the trochanter (Fig. 3).

Group 3 species are generally relatively small and chunky, although *H. numerosepunctatus* is among the largest of Australian *Hydrochus*. One species, *H. obsкуроaeneus*, is extremely common across Northern Australia. The species are primarily inhabitants of smaller, often intermittent, streams where they live among stones and detritus at the edges. Two species appear to be at least partially terrestrial, having been collected from wet forest litter.

Hydrochus chitraae Makhan, 1994 and *H. chitaniie* Makhan, 1994, described from New Guinea, belong in this group.

Hydrochus gitaraiae Makhan

Hydrochus gitaraiae Makhan, 1994

Types

Holotype: male, 'New Guinea Neth Mol Maffen, 22 km E of Sarmi July 18, 1959' 'm.v. light trap Maa' 'Hydrochus gitaraiae det D. Makhan 1994', BPBM.

Paratype: same data as holotype. In Hungarian National Museum, Budapest. Not seen.

Description (number of dissected males examined, 5) Fig. 34

Length 1.8 – 2.3mm. Elongate-oval. Head shiny black; pronotum shiny dark brown to black; elytra shiny black; ventral surface dark-brown to black, legs dark testaceous, parts of tarsi, knees and much of femora darker. Head with scattered large punctures, frons weakly granulate, epicranial suture well marked. Pronotum with rather sparse large punctures, with bare areas in between, foveae obsolete. Elytra with rather even sized well marked punctures not or only slightly increasing in size towards middle within striae. Alternate interstriae weakly raised towards apex, interstriae eight weakly raised, incorporating plica. Pronotal epipleuron weakly delineated, narrow, about a puncture width wide, almost completely or partially absent in some. Pseudoepipleuron narrow posteriorly moderate anteriorly, elytral epipleuron absent behind, narrow in front. Profemur stout, basal pubescence weak, absent ventrally. Mesofemur relatively stout, weakly narrowing towards base, basal pubescence reaching to about end of trochanter on posterior margin. Metafemur moderately stout. Setae on head and basal half of elytra moderate to strong, weak to moderate on pronotum. Front of mesosternum in middle with two subparallel raised carinae, area between them moderately deep.

Male: Basal piece of aedeagus broad, weakly narrowing toward base, 1.2 – 1.5 times length of apical piece. Parameres broad at base, weakly constricted a bit before tip, tip relatively broad, diagonally truncated. Central lobe moderate, nearly as long as parameres (Fig. 34).

Distribution

Northern Territory

Muirella Park, Kakadu NP, DPIM.

Queensland

29 km S Bamaga, ANIC, SAMA; 9 km ENE Mt Tozer, ANIC.

Remarks

This seemingly rare northern species is the smallest group 3 species yet known (<2.5mm). Apart from its small size it differs from other group 3 species by its weak or, in some cases, virtually absent, pronotal epipleura, and the wide obliquely truncated tip to the parameres (Fig. 34). Among group 3 species, it shares with *H. horni* the relatively uniformly-sized elytral punctures, strongly developed setae on the head and elytra and bare shiny areas on the pronotum. Also occurs in New Guinea.

Biology

Nothing known.

Hydrochus granicollis Lea

Hydrochus granicollis Lea, 1926.

Types

Lectotype: female 'granicollis Lea TYPE Wahroonga', SAMA. Herein designated.

Paralectotypes: 2, 'Wahroonga H.J.C.1.24' 'Co-type' 'Griffith Collection id. by A.M. Lea', SAMA. Herein designated.

Description (number of specimens examined, 22)
Fig. 37

Length 2.0 – 2.6mm. Relatively broad, elytra widest behind middle. Head shiny black; pronotum and elytra shiny dark brown to black; ventral surface dark brown, legs testaceous. Head rather smoothly granulate/punctate, epicranial suture well marked. Pronotum strongly granulate/punctate, foveae weak not bounded by raised carinae. Elytra with moderate sized well impressed punctures, those in any one stria of similar size apart from extreme base and apex, adjacent punctures in different striae same size; alternate interstriae moderate to quite strongly raised, some lateral interstriae may be granulate; plica absorbed into interstriae eight; apical punctures usually strong, apex rounded. Pronotal epipleuron moderate, about two puncture widths wide. Pseudoepipleuron wide, elytral epipleuron absent behind, narrow in front. Setae weakly developed on head and at base of elytra. Front of mesosternum in middle with two subparallel raised carinae, area between them moderately deep. Profemur stout, basal pubescence weak, absent or very narrow ventrally. Mesofemur relatively stout weakly narrowed towards base, basal pubescence moderately developed, reaching

a little past end of trochanter on hind margin. Profemur moderately bowed on front edge.

Male: Basal piece of aedeagus parallel sided, 1.3 – 1.4 times length of apical piece. Parameres weakly bulbous in basal half, twisted open in front half to cradle central lobe, narrowing towards tip. Central lobe moderately wide, narrowing in front (Fig. 37).

*Distribution***Australian Capital Territory**

Black Mountain, ANIC; Cotter River, ANIC; Kambah Pool, ANIC.

New South Wales

Cabbage Tree Creek, ANIC; Hawksbury River, SAMA; Kiola Forest Park, 15 ml N Batemans Bay, ANIC.

Remarks

A southern species known only from a limited area of the South-east, *H. granicollis* resembles *H. horni* in general appearance and in its relatively even-sized elytral punctures. In general it is a chunkier species with more strongly developed dorsal sculpture but much more poorly developed setae. The apex of the elytra is rounded rather than pinched as is often the case in *H. horni* and the apical punctures are usually very large in contrast to the small to moderately sized ones in *H. horni*.

Biology

Found among stones and leaves at the edges of running water. The specimens from Kiola are labelled as coming from wet sclerophyll litter.

Hydrochus horni Blackburn

Hydrochus horni Blackburn, 1896

= *H. scabricollis* Lea, 1926; syn. nov.

Types

Hydrochus horni Blackburn. *Lectotype*: 'Type' 'T 5488 Paisl. Bl.' 'Australia Blackburn Coll BM. 1910–236' 'Hydrochus interioris Blackb.' 'Hydrochus horni Blackb. Type fide Lea TRSSA 1926–147 Balfour Browne det', BMNH. Herein designated.

Paralectotypes: 1, 'Cent-Aust Coll Horn Exp Pres 7.97' 'Hydrochus Horni, Blackb.' with more recent red labels 'Type' 'Syntype T-13197 Hydrochus horni Blackburn 1896', NMV. This

specimen cannot be considered the holotype since the BMNH specimen was clearly marked 'T' by Blackburn; 1, 'Paisley Bluff Cent Auk Horn. Exp' 'Hydrochus horni Blk. del. by Blkb.' 'F.E. Wilson Collection' with more recent blue labels '2295 Cotype' 'Paratype T2295 Hydrochus horni Black.', NMV; 1, '5488 Paisley B.' 'Hydrochus interioris, Blackb. Co-type', SAMA; 2, '5488 Paisl Bluff' 'interioris Blackb.' 'this is horni BI', SAMA. Herein designated. I agree with Lea (1926) that the BMNH and SAMA specimens are *H. horni* and were mislabelled by Blackburn.

Hydrochus scabricollis Lea. *Lectotype*: 'Scabricollis Lea TYPE Parachilna', SAMA. The left hand specimen above 'TY' of four specimens on one card herein designated.

Paralectotypes: 3, same data as holotype, SAMA; 1, 'S. Australia' 'A.H. Elston Collection' '2625 Hydrochus scabricollis Lea Co-type S. Australia' 'Paratype', AM; 5, 'Co-Type' 'Parachilna Hale Flinders Range' 'Griffith Collection id by A.M. Lea', SAMA; 1, 'Co-Type' 'Lucindale S. Australia', SAMA.; 2, 'Lucindale S Australia' 'Hydrochus scabricollis' 'Co-type 2795' 'Lea, Co-type', QM. Herein designated.

In NMV there are additional specimens obviously collected and labelled at the same time as the specimens later labelled as co-types. I am unaware of why some have been labelled as co-types and others not. The SAMA paralectotypes were labelled co-types by Blackburn, albeit incorrectly.

Description (number of specimens examined, 193) Figs 35, 36

Length 2.0 – 3.4mm. Elongate, elytra a little wider behind middle. Head shiny black; pronotum and elytra shiny dark brown to black; ventral surface dark brown, legs dark testaceous, parts of tarsi, knees and much of femora darker. Head granulate/punctate. Pronotum granulate/punctate varying from quite strongly and evenly rugose to relatively smooth with large areas bare of sculpture, foveae weak, often bounded by flat broad smooth areas. Elytral punctures well marked, not or only slightly increasing in size beyond the first few basal punctures. Punctures in adjacent striae similar sized, lateral interstriae occasionally granulate, interstriae not or only weakly raised particularly alternate interstriae toward apex, plica absorbed into interstria eight. Setae on head moderate to strong often present on pronotum as well, much of elytra setose. Pronotal epipleuron weak to moderate, 0.5 to

1.5 puncture widths wide, often poorly delineated. Pseudoepipleuron weak to moderate, elytral epipleuron absent behind, narrow in front. Front of mesosternum in middle with two weakly diverging longitudinal carinae, area between them moderately deep in front becoming very shallow behind. Profemur stout, basal pubescence weak to absent or virtually so ventrally. Mesofemur relatively stout to moderately elongate, narrowing towards base, basal pubescence moderate reaching end of trochanter or a bit past it on hind edge.

Male: Basal piece of aedeagus parallel sided or weakly constricted in middle, 1.6 – 2.0 times length of apical piece. Apical piece ranging from strongly dolphin-headed to almost smoothly triangular. Central lobe narrow reaching almost to tip of parameres (Figs 35, 36).

Distribution

Australian Capital Territory

25 km W Canberra, ANIC.

New South Wales

8 km N Bombala, SAMA; Kittys Crossing, ANIC; Monga, ANIC; Nerrigan, SAMA; Webers Creek, SAMA.

Northern Territory

33 km WNW Alice Springs, ANIC; Ellery Creek, NMV, SAMA; Ormiston Gorge, SAMA; Paisley Bluff, NMV; Simpsons Gap, SAMA; Standley Chasm, ANIC, SAMA; Vaughan Springs, SAMA.

Queensland

8 km N Bluewater, SAMA; Mary Creek 16°33S 145°12.5E, ANIC; Pentland, ANIC.

South Australia

Alligator Gorge, SAMA; Flinders Ranges, SAMA; Lucindale, QM; Mt Gambier, SAMA; 13 km W Meadows, SAMA; 1 km S Nangwarry, SAMA; Robe, SAMA; Williamstown, ANIC, SAMA.

Tasmania

8 km S Lake Leake, ANIC

Victoria

East Pombornit, ANIC; Nathatia, SAMA; 4 km NNE Nelson, NMV; 5 km NW Portland, SAMA; Strathbogie, NMV; Tarra Valley, NMV; 6 km ENE Terang ANIC; 12 km SW Orbost, SAMA.

Western Australia

11 km E Ashburton Downs Homestead, WAM; Gill Pinnacle, WAM; 50 ml S Giles, WAM; Millstream, ANIC; 13 km ESE Mooka Station, WAM; 20 km NE Mt Sandiman, WAM; Murchison River, ANIC.

Remarks

Hydrochus horni is the southern counterpart of *H. obsкуроaeneus*, occurring relatively commonly across southern Australia including semi-arid regions such as the Pilbara, Central Australia and the Flinders Ranges as well as more coastal regions of the South-east. It is also found, rarely, in Queensland as far north as the Atherton Tableland. It can be separated from *H. obsкуроaeneus* by the more usually sized elytral punctures which, beyond the basal four to five, are subequal in size until nearing the elytron apex. Its clearest distinguishing character is the bare shiny areas on the pronotum of most specimens. (These are often absent on central Australian specimens.) Among group 3 species it tends to have the most elongate mesofemora with the greatest development of the basal pubescence. Both these characters occasionally approach the condition seen in some group 4 species. The weak basal pubescence on the profemur, the generally less elongate body, and strong development of dorsal setae separate it from any species in group 4.

Hydrochus granicollis resembles *H. horni* in many respects and is also sympatric with it in south-eastern Australia. *Hydrochus granicollis* tends to be a chunkier species, with a granulate pronotum without bare areas, has the apical punctures on the elytra often much larger than in *H. horni* and a more rounded apex to the elytra which often appears pinched in *H. horni*. The aedeagus of *H. horni* resembles that of *H. obsкуроaeneus* with which it is sympatric in north Queensland. The two can be separated by the relatively smaller apical piece in *H. horni* (basal piece 1.6 – 2.0 times apical piece in length, in *H. horni*; 1.0 – 1.3 times in *H. obsкуроaeneus*). Within *H. horni* there is a considerable degree of variation in the shape of the apical piece, although its comparatively short nature remains. In typical *H. horni* from central Australia the apical piece is particularly short and squat generally resembling the head of a dolphin. In other locations this shape is still present but other specimens tend to have the apical piece more elongated which has the effect of obliterating the dolphin-head shape and replacing it with the more usual triangular one in extreme cases. All intermediate shapes occur.

Hydrochus gitaraiae from Cape York and Arnhem Land closely resembles *H. horni*, particularly in the typical bare shiny areas on the pronotum, but is smaller and has a broader, differently shaped apical piece to the aedeagus.

Biology

Found at the edges of small rivers, creeks and ponds among stones and detritus.

Hydrochus numerosepunctatus sp. nov.

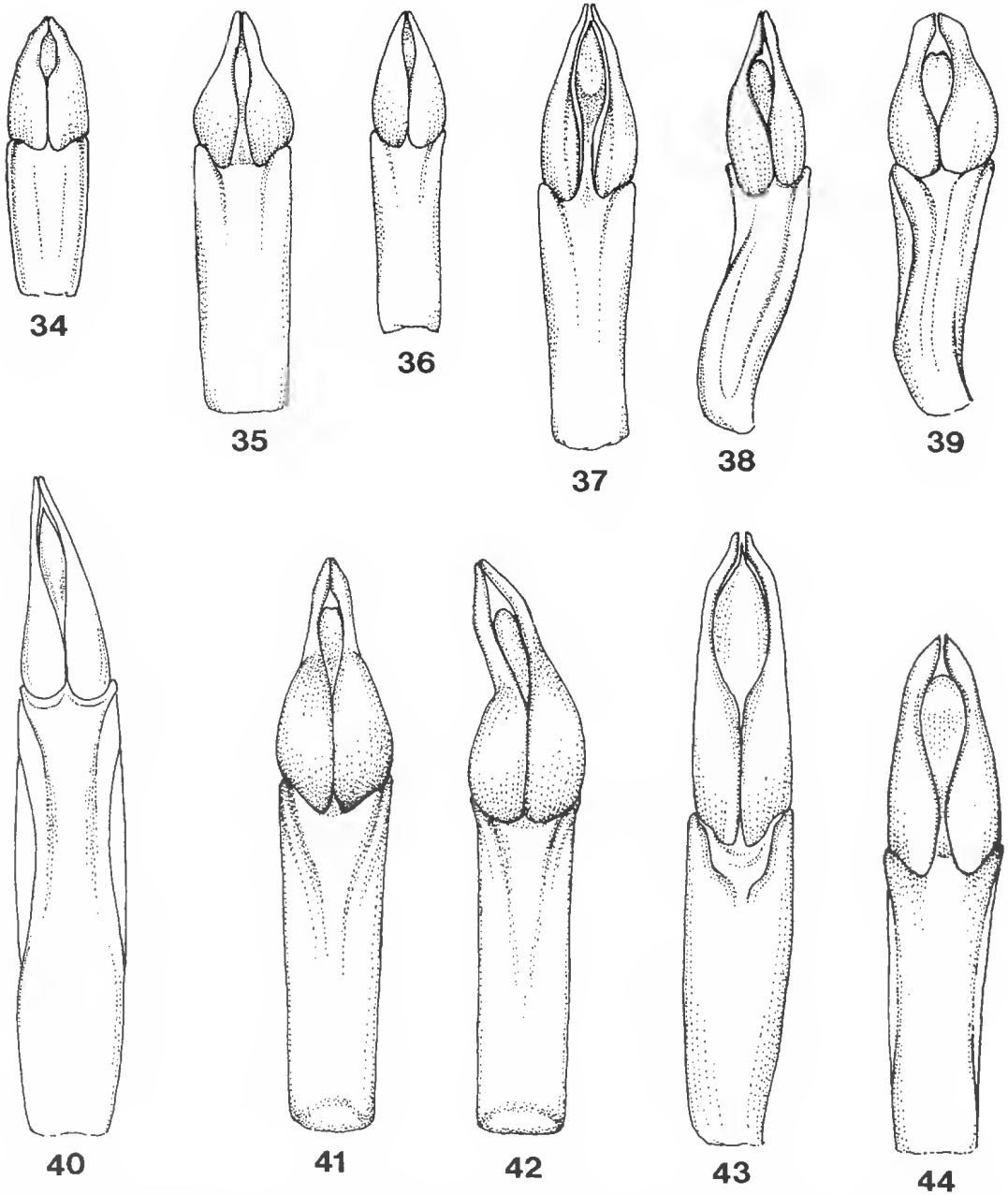
Types

Holotype: male, 'NT 1 km W Gubara Kakadu NP 17.3.98 C.H.S. Watts', SAMA.

Paratypes: 18, same data as holotype, SAMA; 10, 'AUSTRALIA: N.T. Kakadu NP Gubara 50 m. 25.10.1996 leg. L. Hendrich (1)', NHMW.

Description (number of specimens examined, 62)
Fig. 30

Length 2.7 – 4.2mm. Elongate, elytra widest behind middle, quite rapidly narrowing to apex. Head shiny black, pronotum and elytra shiny dark brown to black; ventral surface dark red to black, legs testaceous, parts of tarsi, knees and much of femora darker. Head granulate/punctate, epicranial suture moderately impressed. Pronotum rugose, densely granulate/punctate, foveae weak to virtually absent. Elytra very deeply punctate, interstriae granulate to varying degrees, punctures in each stria increase in size toward middle from base and apex, punctures in adjacent stria same size or slightly larger from stria one to four. Alternate interstriae not or only weakly raised particularly toward apex and interstria eight. Plica absorbed into interstria eight. Pronotal epipleuron well marked about two punctures deep, fluted. Pseudoepipleuron moderate, elytral epipleuron absent behind, narrow in front, virtually invisible when elytra closed. Setae weak to very weak on elytron apex. Profemur moderately stout, basal pubescence weak, absent or virtually absent ventrally. Mesofemur relatively stout, narrowing somewhat toward base, basal pubescence weak, reaching approximately the end of trochanter on rear edge. Metafemur relatively stout, bowed on front edge. Front of mesosternum in middle with two longitudinal carinae, area between them deep in front becoming shallow behind. Metasternum evenly covered with relatively small (for *Hydrochus*) punctures not arranged in any pattern.



FIGURES 34–44 34, *H. gitaraiiae*; 35–36, forms of *H. horni*; 37, *H. granicollis*; 38, *H. aschnakiranae*; 39, *H. kunarajahi*; 40, *H. multicolor*; 41–42, forms of *H. australis*; 43, *H. abditus*; 44, *H. radjiei*.

Male: Basal piece of aedeagus parallel sided 1.2 – 1.6 times length of apical piece. Apical piece bullet shaped, parameres rather regularly narrowing toward pointed tip. Central lobe moderately broad reaching to tips of parameres (Fig. 30).

Distribution

Northern Territory

Bamboo Creek near Wangi, NTM; Cooper Creek 19 km E by S Mt Borradaile, ANIC; 6 km SE Mt Borradaile, SAMA; 5 km SE Mt

Borradaile Station, SAMA; Gubara, Kakadu NP, NHMW, CLH, SAMA; 1 km S Gubara, Kakadu NP, SAMA; Holmes Jungle, NTM; 1 km S Jim Jim Falls, Kakadu NP, NHMW; Katherine Gorge, NTM; Koongarra, ANIC; Murganella, NTM; 6 km SW by S Oenpelli, ANIC.

Remarks

One of the largest of Australian *Hydrochus*, *H. numerosepunctatus* appears to be relatively common in coastal Northern Territory. It shows, with *H. obscuroides*, the character of increasing size of elytral punctures from the elytral base to the middle. The species can be separated from most *H. obscuroides* by its generally larger size (2.7 – 4.2mm against 1.8 – 3.0mm), deep but not particularly large elytral punctures, lack of pronotal fovea and granulate elytra. The male genitalia resemble those of some *H. obscuroides* but the apical piece is relatively smaller. The numerous, evenly distributed, metasternal punctures are unique within Australian *Hydrochus*, although occasional specimens of other species may approach the condition seen in *H. numerosepunctatus*.

Biology

Little known, but appears to be associated with small creeks.

Etymology

Latin. 'many punctured' – in reference to the numerous punctures on the mesothorax.

Hydrochus obscuroides Fairmaire

Hydrochus obscuroides Fairmaire, 1879

= *Hydrochus palmerstoni* Blackburn, 1895; syn. nov.

= *Hydrochus insularis* Lea, 1926; syn. nov.

= *Hydrochus rodjani* Makhan, 1994; syn. nov.

= *Hydrochus wewalkai* Makhan, 1994; syn. nov.

Types

Hydrochus obscuroides Fairmaire. *Holotype*: not located, type locality given as Pt. Makay (?= Mackay), Queensland.

Hydrochus palmerstoni Blackburn. *Holotype*: female: 'T 3921 NT' 'Australia Blackburn Coll.

B.M.1910–236' 'Hydrochus Palmerstoni, Blackb.', BMNH.

Hydrochus insularis Lea. *Lectotype*: male, 'insularis Lea TYPE Groote Eyl.' 'Groote Eylandt N.B.Tindale', SAMA. Herein designated.

Paralectotypes: 3, 'Groote Eylandt N.B. Tindale' 'Co-type' 'Griffith Collection Id by A.M.Lea', SAMA. Herein designated.

Hydrochus rodjani Makhan. *Holotype*: 'New Guinea Papua Brown River May 21, 1956' 'E.J. Ford jr. Light trap', BPBM.

Hydrochus wewalkai Makhan. *Holotype*: male 'Australien 17.1.1993 Queensland Townsville 10m leg Wewalka (8)' 'Hydrochus wewalkai det D. Makhan 1994' with red Holotype label, NHMW.

Description (number of specimens examined, 162 dissected males) Figs 3, 31, 32, 33

Length 1.8 – 3.0mm. Moderately elongate, a little wider behind middle of elytra, elytral apex not greatly 'pinched'. Head black; pronotum dark brown-black with metallic tinges, extreme front margin often lighter; elytra dark testaceous to black; ventral surface dark brown to black, antennae and palpi testaceous, palpi usually with darker tips; legs light testaceous, parts of tarsi and knees darker. Head moderately to strongly punctate/granulate, epicranial suture moderate. Pronotum strongly punctate/granulate, foveae weak-quite strong, occasionally delineated by narrow raised areas. Elytra strongly sculptured, punctures well marked, very variable in size, relatively small to very large, those in each stria increasing in size towards disc from both base and apex of elytra, adjacent punctures in different striae approximately same size, weakly to moderately granulate, alternate interstriae, particularly numbers 4, 6 and 8 weakly to moderately raised for most of their lengths, plica absorbed into interstria 8. Weak to moderate setae on head and apical half of elytra. Pronotal epipleuron distinct, about two puncture widths wide, fluted. Elytron with relatively narrow pseudoepipleuron, epipleuron absent behind, very narrow in front half. Front of mesosternum in centre with two narrow carinae, area between them moderately deep. Profemur stout, basal pubescence weak, lacking or virtually so ventrally (Fig. 3). Mesofemur moderately elongated, weakly sinuate, narrowing slightly towards base, basal pubescence moderately developed not, or only slightly, extending beyond trochanter on posterior edge (Fig. 3). Metafemur moderately sized, weakly bowed on front edge.

Male: Basal piece of aedeagus parallel sided or narrowing towards base 0.8 – 1.3 times length of apical piece; parameres variable from narrowly triangular to quite broad, waisted and with rounded tip, central lobe variable from narrow to broad, only slightly shorter than parameres. There is considerable variation in the degree of elongation of the apical piece resulting in a corresponding variation in degree of constriction of parameres, expansion of the central lobe, narrowness of the parameres and the comparative length of the basal and apical pieces (Figs 31, 32, 33).

Distribution

Northern Territory

1 km SE Batchelor, SAMA; Barramundi Creek, Kakadu NP, SAMA, CLH, NHMW; Berry Springs, ANIC; Bessie Springs, ANIC; 11 km SW by S Borroloola, ANIC; 46 km SSW Borroloola, ANIC; 22 km WSW Borroloola, ANIC; 54 km S by W Borroloola, ANIC; 80 km SW Borroloola, ANIC; 5 km NNW Cahills Crossing, ANIC; 1 km N Cahills Crossing, ANIC; 8 km ESE Cape Crawford, ANIC; Coomalie Creek, CAL; Darwin, SAMA; Edith Falls near Katherine, CAL, ANIC; Gubara, Kakadu NP, NHMW, CLH, SAMA; 1 km W Gubara, Kakadu NP, SAMA; Gungurul Lookout, Kakadu NP, NHMW; Holmes Jungle, ANIC, SAMA; Howard Springs, NMV, ANIC, SAMA; Humpty Doo, DPIM; 10 km SW Jabiru, SAMA; 12 km E Jabiru, SAMA; Jim Jim Falls, NHMW, CLH; Katherine, ANIC; Koongarra, ANIC; Litchfield NP, NHMW; Magela Creek, ANIC; Manton Dam, ANIC; 19 km E by S Mt Borradaile, ANIC; 6 km SE Mt Borradaile, SAMA; 5 km SE Mt Borradaile Station, SAMA; 19 km E by N Mt Cahill, ANIC; 10 km E by N Mt Cahill, ANIC; 1 km NNW Mudginberry Homestead, ANIC; Naberlek Dam, ANIC; Nawurlandja, Kakadu NP, SAMA; Nourlangie Creek, ANIC; 18 km E by N Oenpelli, ANIC; 31 km SE by S Pine Creek, ANIC; South Alligator River, ANIC; South Alligator Inn, ANIC; South Johnston River, Old Jim Jim Road Crossing, SAMA; Tindal, NMV; Wildman River Lagoon, ANIC.

Queensland

Archer River, SAMA; Bloomfield, ANIC; Boggy Creek near Cooktown, ANIC; Burdekin River near Charters Towers, SAMA; Captain Billy Creek, SAMA; Cairns, CAL; Cape Tribulation, ANIC; 30 ml N Cape Tribulation, ANIC; Coen,

MCZ; 60 km S Coen, SAMA; 40 km N Coen, SAMA; 21 km W by N Cooktown, ANIC; 29 km NW by N Cooktown, ANIC; Dalhenty River, SAMA; Dalrymple, 30 km N Charters Towers, NHMW; Giru, ANIC; 10 km SW by W Gordonvale, ANIC; Greenvale, NHMW; 70 km SW Greenvale, SAMA; Hann River, NMV; 7 ml N Hope Vale Mission, ANIC; Iron Range, ANIC; 7.5 km NNW Kuranda, DPIM, ANIC; Laura, DPIM; 73 km NW by W Laura, ANIC; 30 km N Laura, DPIM; 12 km N Laura, SAMA; 31 km NW by N Longreach, ANIC; 9.5 km SW Mareeba, DPIM; McIllwraith Ranges., SAMA; 1 km W Mingela, SAMA; 3.5 km SW by S Mt Baird, ANIC; Mt Garnet, SAMA; 40 ml SW Mt Garnet, CAL; 21 ml up Mt Lewis Road, DPIM; Mt Spec, ANIC; 11 km ENE Mt Tozer, ANIC; 2 km N Mt Tozer, ANIC; 9 km ENE Mt Tozer, ANIC; 3 km NE Mt Webb, ANIC; Peach Creek, SAMA; 11 km WSW Petford, DPIM; 1 km W Petford, SAMA; Reid River E of Mingela, SAMA; Rockhampton, CLH; Shiptons Flat, ANIC; Silver Plains, MCZ; Tolga, DPIM; Townsville, CAL, MCZ, NHMW; 10 km NW Townsville, SAMA; Thornton Range, ANIC; Walkamin, DPIM; Weipa, DPIM;

Western Australia

Carson Escarpment, ANIC; Drysdale River, ANIC; Gallery Hill, WAM; 14 km S by E Kalumburu Mission, ANIC; 4 km W King Cascade, ANIC; Millstream, ANIC; Mitchell Plateau, FIELD, ANIC; 3 ml SE Pago Mission, FIELD; Prince Frederic Harbour, ANIC; 2 km SW Rolly Hill, ANIC; Mitchell Plateau, ANIC; Synnot Creek, ANIC.

Remarks

A very common and widespread species in northern Australia. It shares, with *H. numerosepunctatus*, the character of the elytral punctures in at least the inner rows increasing in size until about the middle of the elytra. In other group 3 species (and most other Australian *Hydrochus*) the size of the elytral punctures increases rapidly from small to moderate within the basal one to four or five punctures and remaining approximately the same size until close to the apex. In *H. obscuroides* the increase continues, albeit at a reduced rate well onto the elytral disc. The actual size of the elytral punctures is very variable from comparatively modest to extremely large.

Hydrochus obscuroides can be separated from *H. numerosepunctatus* by the latter's

unusual punctuation of the mesosternum. Most specimens of *H. numerosepunctatus* are also larger (2.7 – 4.2mm) than *H. obsкуроaeneus* (1.8 – 3.0mm).

Hydrochus obsкуроaeneus is unusually variable in both size of elytral punctures and in the shape of the aedeagus. However, study of over a thousand specimens, 162 of which were males with their aedeagi extracted, has convinced me that only one species is involved. I could detect no strong pattern in either character, with extremes of both occurring throughout its geographic range, except possibly a preponderance of specimens with strong punctures and wide, waisted aedeagi (Fig. 33) on Cape York. Nor is there any apparent linkage between puncture size and aedeagus shape. All intermediate shapes exist but the relatively weakly punctured elytra and thin elongate triangular-shaped aedeagi are by far the most common forms.

I have been unable to trace the holotype of *H. obsкуроaeneus* and base my identification on the brief description; primarily its small size, nondescript colour, large elytral punctures and locality.

The holotype of *H. palmerstoni* is a female and has moderately large elytral punctures; the lectotype of *H. insularis* has moderately sized elytral punctures and an aedeagus with a broad central lobe but the apical piece is not waisted (similar to Fig. 32); the holotype of *H. wewalkai* has slightly larger elytral punctures and a broad, weakly waisted, apical piece to the aedeagus. The holotype of *H. rodjani* is similar to that of *H. insularis* in elytral punctuation and aedeagus. All of these fall within my concept of *H. obsкуроaeneus*.

Biology

Most specimens have been taken among stones and vegetation at the edges of small rivers, creeks and ponds. Some specimens from Cape Tribulation in ANIC were collected from 'rainforest leaf & log litter'.

Species Group 4

Group 4 species are characterised by having: two rather than three longitudinal carinae at the front of the mesosternum; the mesofemur weakly spindle-shaped (Fig. 4); the pubescence at the base of the mesofemora usually reaching > a third the width of the femur at that spot along the rear

edge; the basal pubescence on the profemora complete and reaching > a quarter the width of the femur at that spot along the femur. Other character states that help to define the group are: elongate; plain darkish in colour—although often with a slight metallic sheen; some interstriae may be weakly raised (in *H. multicolor* interstriae two and four are often strongly raised for part of their length); dorsal setae weak to moderate; pronotum with moderate to strong fovea; pronotal epipleura weak to moderate; head with weak epicranial suture.

Perhaps the most phylogenetically coherent group with most species only identifiable by the form of the aedeagus. *Hydrochus multicolor* stands a bit apart from the others.

They are the predominant group in southern Australia where they are often abundant but are also widespread and common in the north. They are still-water species most frequently found amongst emergent vegetation in relatively shallow water.

Hydrochus abditus sp. nov.

Types

Holotype: male, 'S. Aust Meadows 13 km W 35°11S 138°36E 28 Sept 96 C.H.S. Watts', SAMA.

Paratypes: 18, same data as holotype, SAMA; 14, 13 km W Meadows S.A. 26.9.98 C.H.S. Watts', SAMA.

Description (number of specimens examined, 50)
Fig. 43

Length 2.4 – 3.5mm. Relatively broad, particularly elytra, widening slightly behind middle of elytra, narrowing apically. Dorsal surface black, ventral surface black, antennae and palpi testaceous, legs testaceous, parts of tarsi, knees and much of femora darker. Head with rather sparse large punctures, occasionally granulate; epicranial suture strongly impressed. Pronotum moderately punctate, granules absent or confined to sides; foveae weak, shallow, usually without raised margins. Elytral punctures relatively large; alternate interstriae not or only slightly raised; plicae weak. Setae on head moderate, often quite extensive over posterior half of elytra. Pronotal epipleuron well marked, relatively broad with strong vertically elongate punctures/grooves. Pseudoepipleuron moderately broad; elytral epipleuron absent posteriorly, enlarging anteriorly to about one quarter to one

third width of pseudoepipleuron in same position. Front of mesosternum in centre with two longitudinal carinae, the area between them rather shallow. Profemur with basal pubescence moderate, about one quarter width of femur ventrally. Mesofemur weakly narrowing towards base, basal pubescence well developed, about one third width of femur along posterior margin. Metafemur weakly bowed.

Male: Basal piece of aedeagus straight sided 1.1 – 1.3 times length of apical piece. Parameres thick in basal half, rapidly narrowing to a slim, weakly sinuate apical third. Central lobe wide, only a little shorter than parameres (Fig. 43).

Distribution

New South Wales

Armadales, ANIC; Congo, ANIC; 2 km N Batemans Bay, SAMA; 8 km N Failford, SAMA; MacLean, SAMA; 2 km S Nowra, SAMA; Royal National Park, CAL; Tamworth, CAL.

Queensland

North Pine River, MCZ; Yungaburra, MCZ.

South Australia

Adelaide, SAMA; 13 km W Meadows, SAMA; Myponga, SAMA; Williamstown, SAMA.

Tasmania

35 km E Hobart, NHMW; Launceston, QM; 40 km E Launceston, NHMW; 60 km E Launceston, NHMW; St. Helens, SAMA.

Victoria

11 km E Bruthen, SAMA; Cann River, ANIC; Dartmoor, SAMA; Ferntree Gully, SAMA; 4.5 km SW Healesville, FIELD; 4 ml NNE Nelson, NMV; 12 km SW Orbost, SAMA; Wyperfield NP, ANIC.

Western Australia

Millstream, ANIC; 1 km N Millstream, ANIC.

Remarks

A relatively common species in coastal southern Australia. Two other group 4 species are sympatric with it in southern Australia: *H. australis* and *H. multicolor*. *Hydrochus abditus* can be readily separated from *H. australis* by its broader shape, dark colour, weak elytral epipleura and by the greater development of the pronotal epipleura. *Hydrochus multicolor* differs from *H. abditus* by its usually strongly raised elytral striae, raised central panel on the pronotum and its

usually iridescent dorsal sheen, in contrast to the shiny black of *H. abditus*. In northern Queensland I have been unable to reliably separate *H. abditus* from *H. kunarajahi*, *H. radjiei* and *H. aschnakiranae* other than by the male genitalia. In general it is larger, darker and with the elytra proportionally wider than the pronotum than in most *H. aschnakiranae*. From *H. radjiei* it has more weakly developed pronotal fovea and in general a smoother elytra. Specimens from the seemingly isolated population at Millstream in Western Australia are rather more strongly sculptured than others. I have found no characters that will help separate *H. abditus* from *H. kunarajahi* other than in the male genitalia.

Biology

A still water species found among vegetation in ponds or slow moving water.

Etymology

Latin. 'Hidden'—in reference to the species being 'hidden' within *H. adelaidae*.

Hydrochus aschnakiranae Makhan

Hydrochus aschnakiranae Makhan, 1994

= *Hydrochus schillhammeri* Makhan, 1995; syn. nov.

Types

Hydrochus aschnakiranae Makhan. *Holotype*: male, 'Solomon is. Guadalcanal: Roroni 35 km E of Honiara 10 m, 6.V.1964' 'R. Straatman Light Trap', BPBM.

Hydrochus schillhammeri Makhan. *Holotype*: male, 'Australien QL (26) 10 km S Tully S Innisfail, 30 m 25.1.1993 leg Wewalka' 'Hydrochus schillhammeri det D. Makhan 1994' with red holotype label, NHMW.

Description (number of specimens examined, 117; dissected males, 38) Figs 4, 7, 38

Length 2.7 – 3.3mm. Elongate, subparallel, with elytra weakly expanded. Dorsal surface black shiny, elytra and pronotum a little lighter in some, ventral surface black, antennae and palpi dark testaceous, legs light testaceous with knees and parts of femora and tarsi darker. Head moderately punctate with weak flat granules, epicranial groove usually well marked. Pronotum with weak to moderate punctures, lacking granules; foveae shallow to moderate, usually delineated with weak

to moderately raised areas. Elytra with moderately large punctures, alternate interstriae tend to be raised, particularly four and eight, plica moderately strong. Head with weak to moderate setae, elytra with weak to moderate setae apically and on interstriae toward apex. Pronotal epipleuron moderate, about a puncture width wide. Elytron with moderately developed pseudoepipleuron (Fig. 7), epipleuron very narrow posteriorly, weak anteriorly where it is about one third the width of pseudoepipleuron. Front of mesosternum in centre with two longitudinal carinae, area between them relatively deep, shallower behind. Profemur stout, a little sinuate, basal area of pubescence relatively large, narrowest portion ventrally about a quarter width of femur at that point. Mesofemur elongate, weakly narrowing towards base; basal pubescence well developed, at narrowest ventrally about one third to one half width of femur at that point (Fig. 4). Metafemur relatively stout, anterior edge bowed.

Male: Basal piece of aedeagus 1.2 – 1.4 times length of apical piece, slightly to moderately twisted. Parameres rounded at base rather evenly narrowing to blunt tip, left hand paramere (ventral view) indented to accept tip of central lobe to greater degree than right hand one. Central lobe relatively narrow, shorter than parameres, with tip weakly expanded and weakly to moderately skewed to left (Fig. 38).

Distribution

Northern Territory

11 km SW by S Borrooloola, ANIC; Canon Hill, Kakadu NP, SAMA; Cahills Crossing, ANIC; Coastal Plains Research. Station, ANIC; Coomalie Creek, CAL; Darwin, SAMA; 6 km E Humpty Doo, DPIM; 12 km E Humpty Doo, DPIM; Gungurul Lookout, Kakadu, NHMW, CLH; Kongarra, ANIC; Jabiluka Billabong, Kakadu, ANIC; Ja Ja Billabong near Mudginberry, ANIC; Jabiru, SAMA; 5 km NNW Cahills Crossing, ANIC; Mt Borradaile, SAMA; 6 km SE Mt Borradaile, SAMA; 5 km SE Mt Borradaile Station, SAMA; 8 km N Mt Cahill, ANIC; 19 km NE by E Mt Cahill, ANIC; South Alligator Inn, Kakadu, ANIC; Ubirr, Kakadu, NHMW.

Queensland

Archer Bend, SAMA; Annan River ANIC; 20 ml NW Ayr, CAL; 14 ml NW Ayr, CAL; Bundaberg, SAMA; Bushland Beach, 20 km N Townsville, SAMA; Caloundra, SAMA; Coen,

DPIM, SAMA; 40 km N Coen, SAMA; 110 ml S Coen, NMV; 25 ml N Cooktown, ANIC; 8 km N Bluewater, SAMA; Home Hill, SAMA; Laura, SAMA; 12 km N Laura, SAMA; 50 ml W Mackay, ANIC; McIvor River 40 ml N Cooktown, UQIC; 1 km W Mingela, SAMA; 2 ml SW Mt Inkerman, ANIC; 2 km N Mt Molloy, SAMA; 10 km S Mt Molloy, SAMA; 3 km ENE Mt Tozer, ANIC; Musgrave, ANIC; 14 ml SE Normanton, ANIC, CAL; Reid River E of Mingela, SAMA; Rockhampton, ANIC, SAMA; Townsville, CAL, SAMA; 40 km S Townsville, SAMA; 20 km S Townsville, SAMA; 12 km NW Townsville, SAMA; 25 km S Townsville, SAMA; 40 km S Weipa, DPIM.

Western Australia

Mitchell Plateau, FIELD.

Remarks

A moderate-sized, dark species, separable from most *H. australis* by its weaker elytral epipleura, moderate pronotal epipleura and apparent lack of granules other than on front of head. Most *H. australis* have the pronotum and elytra lighter in colour than the head and often quite strongly so, whereas, apart from teneral individuals, *H. aschnakiranae* is uniformly black dorsally. The degree of pubescence on the femora is generally weaker than in *H. australis* but not enough to reliably separate the two. Separation of this species from *H. radjiei* and *H. kunarajahi* can only be done reliably from the aedeagus shape as outlined in the key.

Hydrochus aschnakiranae was described from Guadalcanal in the Solomon Islands but apart from the elytra and pronotum of the holotype being lighter in colour than in most Australian specimens I can't distinguish it from Australian material. (Makhan was mistaken in describing the colour of the head, pronotum and elytra of the holotype as black.)

I consider *H. schillhammeri* Makhan, described from a specimen from North Queensland, to be synonymous with this species. (Makhan's description of the type of *H. schillhammeri* is misleading: its colour is a shiny black, not green; the pronotum is uneven but to say it has ten large, deep depressions is far fetched; alternate elytral interstriae (2, 4, 6, 8 not 3, 5 & 8) are weakly raised but hardly carinate.)

Biology

Found amongst emergent vegetation in still or slowly flowing water. Taken at light.

Hydrochus australis Motschulsky*Hydrochus australis* Motschulsky, 1860= *Hydrochus parallelus* Macleay, 1873; syn. nov.= *Hydrochus regularis* Blackburn, 1898; syn. nov.= *Hydrochus diversiceps* Blackburn, 1898; syn. nov.= *Hydrochus brunneonitens* Lea, 1926; syn. nov.= *Hydrochus serricollis* Lea, 1926; syn. nov.= *Hydrochus polaki* Makhan, 1994; syn. nov.= *Hydrochus rambarani* Makhan, 1994; syn. nov.

Types

Hydrochus australis Motschulsky. *Lectotype*: 'Type' 'Pt Philip' 'Hydrochus australis Motschulsky' with yellow type label, ZMM. Two specimens now mounted on two cards on one pin, the upper specimen, a dissected male, herein designated.

Paralectotype: 1, same details as lectotype, lower specimen, herein designated, ZMM.

Hydrochus parallelus MacLeay. *Lectotype*: 'Hydrochus parallelus M.L.W. Gayndah' 'K 19664'. Left hand specimen of two mounted on one card, AM, herein designated,

Paralectotype: 1, same details as lectotype, right hand specimen, AM, herein designated.

Hydrochus regularis Blackburn. *Lectotype*: female, 'T 1532 V' 'Australia Blackburn Coll B.M. 1910-236' 'Hydrochus regularis, Blackb', BMNH. Herein designated. Blackburn mentioned a specimen from Murray Bridge (SA) and one from Western Victoria in the original description.

Hydrochus brunneonitens Lea. *Holotype*: female, 'brunneonitens Lea, TYPE Queensland', SAMA.

Hydrochus serricollis Lea. *Lectotype*: 'serricollis Lea TYPE Launceston', with 'TY' on card, SAMA. Herein designated.

Paralectotypes: 6, same data as lectotype, SAMA (*H. australis*); 1, 'Lucindale S. Australia' 'Co-type' 'serricollis S. Australia Co-type', SAMA (*H. australis*); 2, 'Launceston' 'Co-type' 'Griffith Collection Id. by AM Lea', SAMA (*H. abditus*); 3, 'Davenport Tas: Lea' 'Tasmanian Towers' 'Griffith Collection Id by AM Lea' '14009 Hydrochus serricollis Lea Tasmania Co-type', SAMA (*H. australis*); 1, 'Strahan Tas: Lea &

Carter' 'Hydrochus serricollis Lea Co-type' 'K 48448' 'Paratype', AM (*H. australis*); 2, 'George Town' 'K50043' 'Hydrochus serricollis Lea Co-type' 'Paratype', AM (?*H. abditus*); 1, 'George Town' 'Hydrochus serricollis Lea Co-type' a more recent Cotype blue label 'Paratype T-13212 Hydrochus serricollis Lea 1926', NMV (?*H. abditus*); 1, 'George Town' 'Paratype T-13213 Hydrochus serricollis Lea 1926', NMV (?*H. abditus*); 2, 'Launceston' 'Co-type' 'Hydrochus serricollis Lea, Co-type', QM (*H. abditus*); 2, 'Co-type' 'Launceston' 'Australia Brit Mus 1924-156' 'Hydrochus serricollis Lea, Co-type', BMNH (*H. australis*); 1, 'Co-type' 'Australia Brit. Mus.1924-156' 'East Tammar', BMNH (? *H. abditus*). Herein designated.

Hydrochus diversiceps Blackburn. *Holotype*: female, '6371 T' 'Albion Brisbane C. Wild. 17.7.92' 'Blackburn coll. 1910-236' 'Hydrochus diversiceps, Blackb.', BMNH.

Hydrochus polaki Makhan. *Holotype*: 'Coll. R.I.Sc.N.B. Australien Ex Coll. Weyers' 'Hydrochus polaki det. D. Makhan 1994' with red holotype label, IRSNB.

Hydrochus rambarani Makhan. *Holotype*: 'Coll. R.I.Sc.N.B. Australien N.S. Wales Coll Knisch Coll d'Orchymont' 'det Knisch parallelus' 'Hydrochus rambarani det. D. Makhan' with red holotype label, IRSNB.

Paratypes 3, same data as holotype, IRSNB.

Description (number of specimens examined, >1000) Figs. 6, 41, 42

Length 2.0 – 3.6mm. Elongate, relatively narrow and parallel sided or clytra weakly expanded. Head black; pronotum dark brown to black, sometimes with anterior margin lighter; elytra light testaceous to dark reddish brown; ventral surface black; antennae and palpi variably testaceous; legs light testaceous with knees, parts of tarsi, and sometimes parts of femora darker. Head and pronotum variably sculptured from smooth and weakly punctured to strongly granulate, pronotal foveae moderately developed, weakly delineated by raised areas. Elytral punctures moderate; interstria four may be weakly raised, plicae weak, granulation lacking to quite strongly developed. Pronotal epipleuron very narrow, virtually lacking in many specimens. Pseudoepipleuron moderate posteriorly, narrowing anteriorly; elytral epipleuron narrow, absent posteriorly, relatively broad anteriorly where it is equal in width or greater (usually) than pseudoepipleuron in same place (Fig. 6). Profemur stout, weakly

constricted at base, basal pubescence well developed, on ventral surface about half width of femur. Mesofemur moderately elongate, weakly narrowing towards base; basal pubescence well developed, reaching approximately the equivalent of the width of the femur along posterior/ventral margin. Metafemur moderately elongate, posterior edge straight, anterior edge evenly bowed, incomplete ventrally. Front of mesosternum in centre with two longitudinal carinae, area between them deep anteriorly but with weakly raised T shaped structure posteriorly. Head with weak to moderate setae; elytra with weak setae at apex and on some interstriae towards apex.

Male: Aedeagus with basal piece approximately five times as long as apical piece, parallel sided. Apical piece often twisted to left (viewed ventrally) to varying degrees; parameres bulbous in basal half, narrow and sinuate apically; central lobe narrow, slightly shorter than parameres (Figs 41, 42).

Distribution

Australian Capital Territory

Black Mt, ANIC; Canberra, SAMA; 30 km SW Canberra, SAMA; 25 km W Canberra, ANIC; Deakin, ANIC; Gungahlin, ANIC.

New South Wales

Armadale, ANIC; 8 km N Bombala, SAMA; Bulla Bulla Tank, SAMA; Clarence River, SAMA; Congo, ANIC; Cooma, SAMA; Coonabarabran, ANIC; 9 km NNE Coonabarabran, ANIC; 28 km N Dubbo, ANIC; Forbs, SAMA; Gilgandra, SAMA; Gindera, CAL; Hay, ANIC; 8 km W Hay, ANIC; 10 km W by S Jindabyne, ANIC; Lake Cowal, ANIC; MacLean, SAMA; Menindee Lake, ANIC, UQIC; Megalong Valley, MCZ; Mittagong, SAMA; 6 ml ESE Nelson Bay, ANIC; 20 ml W Nerringa, SAMA; Nyngan, CAL; Tumut River, CAL; 10 ml N Wagga Wagga, UQIC; Whitton, SAMA.

Northern Territory

Adelaide River, ANIC; Canon Hill, Kakadu NP, SAMA; Coastal Plains Research. Station near Darwin, ANIC; Darwin, SAMA; 15 km SW Elliot, SAMA; 2 km E Ja Ja Billabong, ANIC; 6 km N by E of Mudginberry, ANIC; Jim Jim Creek, ANIC; 8 km E Mt Cahill, ANIC; 18 km WSW Borroloola, ANIC.

Queensland

Alligator River, 20 km S Townsville, SAMA;

Barcardine, QM; 23 km NE Bauhina Downs, ANIC; Bushland Beach 20 km N Townsville, SAMA; Davison River, SAMA; Dalby, SAMA; Gayndah, SAMA; Gladstone, SAMA; Borumba Dam, NHMW, CLH; Brisbane, SAMA, NMV; Cardstone, ANIC; Cairns, QM; Condomine River, QM; Dawson River, QM; Emerald, QM; Goomeri, UQIC; Goondiwindi, SAMA; Greenbank, UQIC; 70 km SW Greenvale, SAMA; 15 km W Gympie, NMV; Hann River, DPIM; 10 km W Imbil, NMV; Inglewood, UQIC; Jarding Crossing, ANIC; Laura, SAMA; Kenilworth State Forest, UQIC; 13 km NW Lowood, UQIC; Mary Creek, ANIC; 14 km N Mt Molloy, ANIC; 50 km SW Mackay, ANIC; 8 km SW Mapleton, NMV; Moggill, QM; 21 ml S Miriam Vale, ANIC; Mt Borradaile, SAMA; 5.5 km SW by S Mt Biggenden, ANIC; Mt Garnet, SAMA, DPIM; 2 ml SW Mt Inkerman, ANIC; Oxley, QM; 10 km W Petri, SAMA; N Pine River, QM; S Pine River, QM; Rockhampton, SAMA, UQIC; 50 ml SW Rockhampton, ANIC; 29 ml SSW Rockhampton, ANIC; Taroom, QM; Townsville, SAMA, UQIC; 40 km S Townsville, SAMA; 25 km S Townsville, SAMA; 30 km SE Townsville, SAMA; Yeppoon, QM.

South Australia

10 km N Coonawarra, SAMA; Fairview Park Conservation Park, SAMA; Mannum, SAMA; Mt Gambier, SAMA; Mt Lofty, SAMA; Murray River, SAMA, UQIC; Murray Bridge, SAMA; 1 km S Nangwarry, SAMA; Naracoorte, SAMA; Penola, SAMA; Warradale, SAMA.

Tasmania

Deloraine, SAMA; Launceston, SAMA; Tooms River, ANIC.

Victoria

Ballan, NMV; 2 km W Brimpaen, SAMA; Buangor, SAMA; Cann River, ANIC; 12 km W Casterton, SAMA; Clines, NMV; Corryong, NMV; Dartmoor, SAMA; Dondangadale, NMV; Dromana, NMV; East Pomorneit, ANIC; Echuca, UQIC; 21 ml E Echuca, ANIC; Grampians, SAMA; Fyans Creek, SAMA; 7 km N Glenisla, SAMA; 5 km NW Halls Gap, SAMA; 3 km NE Hamilton, SAMA; Healesville, SAMA; 4.5 km SW Healesville, FIELD; 4 km SW Healesville, NMV; Inglewood, NMV; Jordan River, NMV; Lake Hattah, ANIC, NMV; Macallaster River, NMV; Melbourne, NMV; Merrijig, NMV;

Moyston, NMV; 10 km NE Mirranawa, SAMA; Mitchell Gorge, NMV; Nathalia, SAMA; Natya, NMV; 4 ml NNE Nelson, NMV; Nhill, NMV; 5 km NW Portland, SAMA; Ringwood, NMV; Stawell, SAMA; Swan Hill, NMV; 3 km SE Taggerty, NMV; 6 km E Terang, ANIC; Warrandyte, NMV; Wellington River, Werribee, NMV; Yarra River, NMV.

Western Australia

Armadale, SAMA; Belmont, FIELD; Boyup Brook, ANIC; Bridgetown, MCZ; Bunburry, ANIC; Darling Ranges, SAMA; 14 ml E Denmark, ANIC; Harvey River, NMV; Kerridale, ANIC; 4 km W King Cascade, ANIC; Maidavail, SAMA; Mandaring Weir, MCZ; Margaret River, NMV; Picton Junction, ANIC; Pinjarra, SAMA; 8 m E Pinjarra, ANIC; 6 km S Pinjarra, SAMA; Thomas River 101ml E Esperance, ANIC; Wilga, ANIC.

Remarks

Perhaps the commonest, most widespread and sculpturally variable of Australian *Hydrochus* which is reflected in the fact that it has been named seven times. If the variation in punctation/granulation of the dorsal surface is ignored the degree of variation is actually surprisingly little as I interpret the species. Most specimens are relatively distinctive, but some specimens, particularly from northern areas, may be inseparable from other species without dissection. Within group 4 it has the strongest pubescence on its legs and the widest elytral epipleura in contrast to the pseudoepipleura. No other group 4 species has the elytra lighter in colour than the head and pronotum, unless teneral. The weak to absent pronotal epipleura in *H. australis* also separates most specimens from related species, although some *H. abditus* also have weakly developed pronotal epipleura. In many specimens, particularly from more southern populations, the apical piece of the aedeagus is skewed sideways. Within Australian *Hydrochus* this character is shared only with *H. aschnakiranae* but in this species all specimens that I have seen have the aedeagus skewed to some degree whereas in *H. australis* there is considerable variation from straight to strongly skewed. In *H. australis* the parameres and the central lobe are equally skewed in contrast to *H. aschnakiranae* in which only the central lobe is skewed. (The type of *H. brunneonitens* is a teneral individual with a relatively light

coloured dorsum and the darker colour on the legs apparently not yet developed.)

Biology

A very common species amongst emergent vegetation in still or slowly flowing water. Taken at light.

Hydrochus kunarajahi Makhan

Hydrochus kunarajahi Makhan, 1994.

Type

Holotype: male, 'AUSTRALIA: NQ Tulley Falls 111–10–1956' 'Light Trap J.L. Gressitt' 'Hydrochus kunarajahi det D. Makhan 1994', BPBM.

Description (number of dissected males examined, 21) Fig. 39

Length 2.7 – 3.5mm. Elongate, widening slightly behind middle of elytra. Head shiny black, pronotum and elytra shiny dark brown to black; ventral surface black; antenna and palpi testaceous, palpi tips darker; legs testaceous, parts of tarsi, knees and much of femora darker. Head moderately punctate/granulate, granules flat, epicranial suture distinct. Pronotum moderately punctate, foveae moderate, usually delineated by thin raised margins. Elytra with moderate sized but deep punctures, alternate interstriae not or only weakly raised, plicae moderate. Head and apical portion of elytra weakly to moderately setose. Pronotal epipleuron well marked, about a puncture width wide. Elytron with weak to moderate pseudoepipleuron, epipleuron absent to weak posteriorly, enlarging to one third to one half width of pseudoepipleuron anteriorly. Front of mesosternum in centre with two longitudinal carinae, area between then deep anteriorly, becoming shallower behind. Profemur weakly sinuate, basal pubescence well developed, ventrally about one quarter width of femur at same place. Mesofemur weakly sinuate, slightly narrower towards base, ventral pubescence well developed about one half to equal width of femur along posterior margin. Metafemur slightly bowed anteriorly.

Male: Basal piece of aedeagus narrowing towards base, about 1.5 – 1.7 times apical piece. Parameres bulbous, at base wider than basal piece, weakly narrowing in middle, slightly widening toward tip. Central lobe wide, about two thirds to three quarters length of parameres (Fig. 39).

*Distribution***Northern Territory**

14 km SW Cape Crawford, ANIC; 8 km ESE Cape Crawford, ANIC; Darwin, NMV; 19 km SSE Mataranka, ANIC.

Queensland

8 km N Bluewater, SAMA; Burdekin River E of Charters Towers, SAMA; 25 km N Laura, DPIM; Mary Creek 14 km N Mt Molloy, ANIC; Mackay, NMV; Reid River E of Mingela, SAMA; Rockhampton, NHMW, CLH; Townsville, CAL, FIELD.

Western Australia

12 km S Kalumburu Mission, ANIC.

Remarks

A relatively large, dark species very similar to *H. abditus*, *H. radjiei* and *H. aschnakiranae* but seemingly much rarer. From *H. aschnakiranae* it can be separated by the male genitalia (see key and Figs 38, 39). From *H. radjiei* it differs in having a weaker pronotal and elytral sculpture, and seemingly lacks the pronotal granules quite frequently found in *H. radjiei*. The male genitalia resemble those of *H. radjiei* and for a while I considered *H. kunarajahi* to lie within that species. They differ however in the narrowing towards the base of the aedeagus, the squatter apical piece and the strongly bulbous paramere bases (Fig. 39).

Biology

Found amongst stones, detritus and emergent vegetation at the edge of slow moving water. Taken at light.

***Hydrochus multicolor* Lea**

Hydrochus multicolor Lea, 1926

= *Hydrochus matthewsi* Makhan, 1995; syn. nov.

Types

Hydrochus multicolor Lea. *Lectotype*: 'multicolor Lea TYPE Mt Macedon'. Right hand specimen of two mounted on one card and identified by 'TY' below it, SAMA, herein designated.

Paralectotypes: 1, same details as lectotype, SAMA; 1, 'Forest Reefs N.S.W. Lea' 'Co-type', SAMA; 1, 'Adelaide Blackburn' 'Co-type'

'C125', SAMA; 2, 'Mt Macedon Victoria H.W. Davey' 'Co-type', SAMA; 2, 'Mt Macedon Victoria H.W. Davey' 'F.E. Wilson Collection' 'Hydrochus multicolor Lea Cotype' with more recent blue label '2287-98 Cotype', NMV. Herein designated.

Hydrochus matthewsi Makhan. *Holotype*: male, 'Australien (19) Queensland Mareeba, 700m 22.1. 1993 leg Wewalka' 'Hydrochus jii det. D. Makhan 1994' with red Holotype label, NHMW. See note below.

Description (number of specimens examined, 78)
Fig. 40

Length 2.7 – 4.4mm. Elongate, elytra weakly widened in middle, rapidly narrowing at apex. Head black, usually with iridescent sheen; pronotum dark brown to black usually with iridescence sheen; elytra dark-brown to nearly black shiny; ventral surface dark-brown, legs testaceous with parts of tarsi, knees and parts of femora darker. Head strongly granulate/punctate, granules often only at sides; epicranial suture weak to moderate. Pronotum rather smoothly granulate/punctate, foveae weak, the central third (longitudinally) of pronotum somewhat raised with sides falling away, almost flanged. Elytron with relatively small, even punctures, moderately to strongly granulate, interstriae two and six usually strongly raised in basal fifth, interstria four usually strongly raised from about level of end of raised portion of interstria two to the apical quarter, where the raised portion ends abruptly; interstria eight raised in basal three quarters incorporating plica. Head and elytra with none to a few setae. Pronotal epipleuron well developed, two to three puncture widths wide, sometimes fluted. Pseudoepipleuron moderately wide, epipleuron absent behind narrow in front. Front of mesosternum in centre with two narrow sharply raised longitudinal carinae, the area between them quite deep. Profemur moderately stout, basal pubescence moderately developed, about a quarter width of femur on ventral surface. Mesofemur elongate narrowing a bit toward base, basal pubescence moderately developed reaching about a quarter width of femur at base along hind ventral margin. Metafemur moderately elongate, weakly bowed on front edge.

Male: Basal piece of aedeagus narrow, straight sided, 1.7 – 1.9 times length of apical piece. Apical piece very narrowly triangular, pointed. Central lobe narrow, expanded a bit towards apex, a little shorter than parameres (Fig. 40).

*Distribution***New South Wales**

2 km N Batemans Bay, SAMA; 8 km N Bombala, SAMA; Collector, SAMA; Hartley Vale, MCZ; Megalong Valley, MCZ; Nyngan, SAMA.

Queensland

Mareeba, NHMW

South Australia

7 km N Forreston, SAMA; Inglewood, SAMA; 5 km NE Inglewood, SAMA; 13 km W Meadows, SAMA; Myponga, SAMA; Williamstown, SAMA.

Victoria

Ballan, NMV; 4.8 km WNW Blackwood, ANIC; Grampians, SAMA; Melbourne, NMV; 12 km SW Orbost, SAMA; Warrandyte, NMV.

Remarks

A large species from south-eastern Australia and the Atherton region of north Queensland. Well sculptured specimens are easily recognisable by the strongly raised elytral interstriae and the unusual raised central region of the pronotum, although this latter character is hard to describe adequately. In a few specimens the elytral interstriae are only weakly raised but even in these the abrupt ending to the raised portions is usually diagnostic. The aedeagus is distinctive and can only be mistaken for some group 2 species which are otherwise very different.

In NHMW there is a specimen collected by Wewalka from Mareeba, Queensland that has been labelled as the holotype of *Hydrochus jii* Makhan. This appears to be a *nomen nudum*. The locality data are identical to those given for the type of *H. matthewsi* Makhan. The male genitalia also match the illustration of *H. matthewsi* given by Makhan. Makhan's brief description would also match the specimen. Since I can find no trace of a labelled holotype of *H. matthewsi* I suspect this specimen is the holotype and I am treating it as such. It agrees with *H. multicolor* Lea in most aspects including aedeagus and pronotum. The elytral interstriae are much less strongly raised than in typical *H. multicolor* although within the variations found in this species. I consider it a junior synonym of *H. multicolor* Lea.

Biology

Found amongst emergent vegetation in still and slow moving water.

***Hydrochus radjiei* Makhan**

Hydrochus radjiei Makhan, 1994

Type

Holotype: male, 'AUSTRALIA: NQ Tully Falls 111-10-1956' 'Light Trap J.L. Gressitt', BPBM.

Description (number of specimens examined, 123: dissected males, 48) Fig. 44

Length 2.6 – 3.8mm. Elongate, widening slightly behind middle of elytra. Dorsal surface shiny, black, ventral black; antennae and palpi testaceous, palpi usually with dark tip, legs testaceous, parts of tarsi, knees and parts of femora darker. Head granulate/punctate. Pronotum with deep strong punctures, often granulate, foveae moderate to strong, bounded by narrow raised areas. Elytra with strong deep and regular punctures, alternate interstriae vary from weakly to quite strongly raised, plicae although strong tend to be absorbed into raised interstriae eight. Head and apex of elytra weakly to moderate setose. Pronotal epipleuron well marked, about one puncture wide or a little wider. Pseudoepipleuron relatively narrow, elytral epipleuron absent to very narrow posteriorly, expanding anteriorly to one third to one half times the width of pseudoepipleuron in same place. Front of mesosternum in centre with two longitudinal carinae, area between them deep in front, becoming shallow in posterior half. Profemur stout, relatively parallel sided, basal pubescence about a quarter width of femur. Mesofemur rather narrow, weakly narrowing basally, basal pubescence strong, reaching one third to one half width of femur along posterior margin. Metafemur relatively elongate, weakly bowed on anterior edge

Male: Basal piece of aedeagus straight 1.4 – 1.7 times length of apical piece. Parameres thick, narrowing in middle, expanding towards tip, central lobe relatively thick, two thirds to three quarters length of parameres (Fig. 44).

*Distribution***New South Wales**

Maclean, SAMA; Yuragin NP, ANIC

Northern Territory

Adelaide River, ANIC; Berry Springs, ANIC; 46 km SSW Borroloola, ANIC; Coastal Plains Research Station, ANIC; Coomalie Creek, CAL; Cooper Creek near Mt Borradaile, SAMA; 52 km

S Darwin, ANIC; Groote Eylandt, ANIC; 12 km NE Howard Springs, ANIC; Humpty Doo, DPIM; 10 km SW Jabiru, SAMA; 20 km SSW Jabiru, SAMA; Katherine, ANIC; Koongarra, ANIC; Lake Bennet, NTM; Manton Dam, ANIC; 11 km SW by S Borroloola, ANIC; 6 km SE Mt Borradaile, SAMA; 19 km E by S Mt Borradaile, ANIC; 5 km SE Mt Borradaile Station, SAMA; 8 km E Mt Cahill, ANIC; 19 km NE by E Mt Cahill, ANIC; 8 km E Mt Cahill, ANIC; Muirella Park Kakadu, DPIM; Murganella, NTM; Pine Creek, SAMA.

Queensland

Archer Bend, SAMA; Archers Creek, ANIC; Ayr, CAL; Bamaga, SAMA, UQIC; Bowling Green Bay NP, SAMA; Bundaberg, SAMA; 8 km N Bluewater, SAMA; Caloundra, SAMA; Cape Flattery, ANIC; Cardstone, ANIC; 40 km N Coen, SAMA; Cooktown, ANIC; 25 km N Cooktown, ANIC; 14 ml NW; Dalhunny River, SAMA; Eubenargee Swamp, SAMA; Green Hills, ANIC; Hann River, DPIM; 10 km N Howard, NHMW, CLH; 7 km N Hope Vale Mission, ANIC; Iron Range, ANIC, UQIC; Mackay, NMV; 40 ml N Cooktown, UQIC; Mt Molloy, SAMA; 9 km ENE Mt Tozer, ANIC; 73 km NW by W Laura, ANIC; 25 km N by W Mareeba, ANIC; Mary Creek, ANIC; 20 ml N Maroochydore, ANIC; Mission Beach, ANIC; Mt Webb NP, ANIC; 3 km NE Mt Webb, ANIC; 5 km ESE Mt Finnigan, ANIC; 17 km N Mt Molloy, ANIC; 52 km SW by S Mt Garnet, ANIC; Rockhampton, NHMW, SAMA; 15 km WNW South Johnstone, DPIM; Strathmore Station, DPIM; 3 km ENE Mt Tozer, ANIC; 2 km NNE Mt Tozer, ANIC

Western Australia

Mitchell Plateau 14°49S 125°50E, ANIC; 3 ml E Pago Mission, FIELD.

Remarks

A relatively large, dark species which is common in coastal northern Australia. Although most specimens can be separated from *H. australis* by colour and weaker elytral epipleura not all can, in which case dissection is required. It is even more similar to *H. aschnakiranae*, but tends to be larger and more robustly sculptured, often with granules on the pronotum which are lacking in *H. aschnakiranae*. Again reliable separation should be based on the male genitalia. These vary a bit in the degree of elongation of the apical piece, and extremely elongated examples can be confused with *H. aschnakiranae*, but *H. radjiei* lacks the twisted basal piece, the asymmetric parameres and narrower skewed central lobe of *H. aschnakiranae*. (The male genitalia of the holotype appear to have the central lobe distorted and not to be naturally skewed: see figure in Makhani, 1994). At the other extreme *H. aschnakiranae* aedeagi can approach those of *H. kunarajahi* (see discussion under that species).

Biology

Found amongst emergent vegetation in still and slow moving water. Taken at light.

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CHECKLIST OF AUSTRALIAN *HYDROCHUS* LEACH

H. abditus sp. nov.
H. adelaidae Blackburn
H. aenigmatis sp. nov.
H. aschnakiranae Makhani
H. atratus sp. nov.
H. australis Motschulsky
H. brunneonitens Lea = *H. australis* Motschulsky
H. burdekinensis sp. nov.
H. cucullatus sp. nov.
H. decorus sp. nov.
H. diversiceps Blackburn = *H. australis* Motschulsky
H. eurypleuron sp. nov.
H. gitaratae Makhani

H. granicollis Lea
H. horni Blackburn
H. imamkhani Makhani
H. insularis Lea = *H. obscuroides* Fairmaire
H. interioris Blackburn
H. kunarajahi Makhani
H. lateviridis Blackburn
H. macroaquilonius sp. nov.
H. matthewsi Makhani = *H. multicolor* Lea
H. multicolor Lea
H. nadesui Makhani = *H. obscuroides* Fairmaire
H. numerosepunctatus sp. nov.
H. obscuroides Fairmaire

- H. obsoletus* Lea
H. palmerstoni Blackburn = *H. obsкуроaeneus* Fairmaire
H. parallelus MacLeay = *H. australis* Motschulsky
H. polaki Makhan = *H. australis* Motschulsky
H. radjiei Makhan
H. rambarani Makhan = *H. australis* Motschulsky
H. regularis Blackburn = *H. australis* Motschulsky
H. rodjani Makhan = *H. obsкуроaeneus* Fairmaire
H. scabricollis Lea = *H. horni* Blackburn
H. schoenmanni Makhan = *H. imamkhani* Makhan
H. schillhammeri Makhan = *H. aschnakiranae* Makhan
H. serricollis Lea = *H. australis* Motschulsky
H. simplicicollis Lea
H. unbratilis sp.nov.
H. verae Makhan = *H. simplicicollis* Lea
H. victoriae Blackburn = *H. adelaidae* Blackburn
H. wewalkai Makhan = *H. obsкуроaeneus* Fairmaire

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